PROJECT MANUAL
HOMER Central School District

2021 CAPITAL IMPROVEMENT PROJECT

80 SOUTH WEST STREET,
HOMER, NEW YORK 13077

HIGHSCHOOL SED #: 11-07-01-06-0-002-016
INTERMEDIATE / JR HIGH SCHOOL SED #: 11-07-01-06-0-007-013
ELEMENTARY SCHOOLSED #: 11-07-01-06-0-006-013
EXISTING PRESS BOX SED #: 11-07-01-06-7-015-003
NEW PRESS BOX SED # : 11-07-01-06-7-023-001

The design of this project conforms to all applicable provisions of the New York State Uniform Fire Prevention and Building Code, the New York State Energy Conservation Code, and the building standards of the New York State Education Department

VOLUME 1

Issued for Bid – December 29th, 2022
Issued to SED – September 12th, 2022

HUNT 2503.036

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845
Telephone (607) 358-1000Fax (607) 358-1800

SECTION 00 01 12
TABLE OF CONTENTS

00 80 00 - PROJECT FORMS

SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

01 10 00 - SUMMARY

01 20 00 - PRICE AND PAYMENT PROCEDURES

01 30 00 - ADMINISTRATIVE REQUIREMENTS

END OF SECTION

SECTION 00 01 15
Drawing List

GENERAL

C0.1	COVERSHEET
G1.1	SYMBOLS AND ABBREVIATIONS
T2.1	TECHNOLOGY DETAILS

ELEMENTARY SCHOOL

CODE COMPLIANCE

ES-CO1.1	CODE COMPLIANCE PLANS
ES-CO1.2	SITE CODE COMPLIANCE PLAN

ABATEMENT

ES-AB1.1	FIRST & SECOND FLOOR ABATEMENT PLANS - AREA C

SITE

ES-L0.1	SITE EXISTING CONDITIONS PLAN
ES-L1.1	SITE DEMOLITION PLAN
ES-L2.1	SITE IMPROVEMENT PLAN
ES-L2.2	PLAYGROUND ENLARGMENT PLAN
ES-L3.1	SITE LAYOUT PLAN
ES-L4.1	SITE GRADING PLAN
ES-L5.1	SITE UTILITY PLAN
ES-L6.1	SITE EROSION AND SEDIMENT CONTROL PLAN
ES-L6.2	SITE E&SC NOTES AND DETAILS
ES-L7.1	SITE DETAILS
ES-L7.2	SITE DETAILS
ES-L7.3	UTILITY AND STORMWATER DETAILS
ES-L7.4	STORMWATER DETAILS

ARCHITECTURAL

ES-A0.1	FIRST FLOOR DEMOLITION PLAN - AREA C
ES-A0.2	SECOND FLOOR DEMOLITION PLAN - AREA C
ES-A0.3	THIRD FLOOR DEMOLITION PLAN - AREA C
ES-A1.1	BASEMENT & FIRST FLOOR PLAN - AREA A
ES-A1.2	FIRST FLOOR PLAN - AREA C
ES-A1.3	SECOND FLOOR PLAN - AREA C

ES-A1.4 THIRD FLOOR PLAN - AREA C
ES-A1.5 ROOF PLAN - AREA A
ES-A1.6 ROOF PLAN - AREA B
ES-A1.7 ROOF PLAN - AREA C
ES-A1.8 ROOF DETAILS
ES-A3.1 EXTERIOR ELEVATIONS
ES-A6.1 SCHEDULES & DETAILS

MECHANICAL
ES-H0.1 ROOF HVAC DEMOLITION PLAN
ES-H1.1 ROOF NEW WORK PLAN

ELECTRICAL
ES-E0.1 FIRST FLOOR DEMOLITION PLAN - AREA A
ES-E0.2 FIRST FLOOR DEMOLITION PLAN - AREA B
ES-E0.3 FIRST FLOOR DEMOLITION PLAN - AREA C
ES-E0.4 SECOND FLOOR DEMOLITION PLAN - AREA A
ES-E0.5 SECOND FLOOR DEMOLITION PLAN - AREA C
ES-E0.6 THIRD FLOOR DEMOLITION PLAN - AREA C
ES-E0.7 ELECTRICAL ROOF DEMOLITION PLAN
ES-E1.1 ELECTRICAL ROOF POWER PLAN
ES-E2.1 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA A
ES-E2.2 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA B
ES-E2.3 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA C
ES-E2.4 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA A
ES-E2.5 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA B
ES-E2.6 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA C
ES-E2.7 THIRD FLOOR LIGHTING & FIRE ALARM PLAN - AREA C
ES-E4.1 SITE ELECTRIC UTILITY PLAN

PLUMBING
ES-P0.1 ROOF PLUMBING DEMO PLAN
ES-P1.1 ROOF PLUMBING STORM PLAN

<u>HIGH SCHOOL</u>

CODE COMPLIANCE
HS-CO1.1 CODE COMPLIANCE PLANS
HS-CO1.2 CODE COMPLIANCE PLANS
HS-CO1.3 SITE CODE COMPLIANCE PLAN

SITE
HS-L0.1 SITE EXISTING CONDITIONS PLAN
HS-L1.1 SITE DEMOLITION PLAN - WEST
HS-L1.2 SITE DEMOLITION PLAN - EAST
HS-L2.1 SITE IMPROVEMENT PLAN - WEST
HS-L2.2 SITE IMPROVEMENT PLAN - EAST
HS-L3.1 SITE LAYOUT PLAN - WEST
HS-L3.2 SITE LAYOUT PLAN - EAST

HS-L4.1 SITE GRADING PLAN – WEST
HS-L4.2 SITE GRADING PLAN - EAST
HS-L5.1 SITE UTILITY PLAN – WEST
HS-L5.2 SITE UTILITY PLAN - EAST
HS-L6.1 SITE EROSION AND SEDIMENT CONTROL PLAN - WEST
HS-L6.2 SITE EROSION AND SEDIMENT CONTROL PLAN - EAST
HS-L6.3 SITE E&SC NOTES AND DETAILS
HS-L7.1 SITE DETAILS
HS-L7.2 STORMWATER AND UTILITY DETAILS

ARCHITECTURAL
HS-A0.1 GROUND FLOOR DEMOLITION PLAN - AREA D
HS-A0.2 FIRST FLOOR DEMOLITION PLAN - AREA A
HS-A1.1 GROUND FLOOR PLAN - AREA C
HS-A1.2 GROUND FLOOR PLAN - AREA D
HS-A1.3 FIRST FLOOR PLAN - AREA A
HS-A1.4 FIRST FLOOR PLAN - AREA C
HS-A1.5 SECOND FLOOR PLAN - AREA D
HS-A1.6 ROOF PLAN - AREA A
HS-A1.7 ROOF PLAN - AREA B
HS-A1.8 ROOF PLAN - AREA C
HS-A1.9 ROOF PLAN - AREA D
HS-A1.10 ROOF DETAILS
HS-A6.1 STAIR & RAILING PLANS & DETAILS, SCHEDULES

FOODSERVICE
HS FS.01 HIGH SCHOOL BASEMENT WALK-IN FREEZER
HS FS.02 HIGH SCHOOL BASEMENT WALK-IN FREEZER

MECHANICAL
HS-H0.1 ROOF HVAC DEMO PLAN
HS-H1.1 1ST FLOOR & PRESS BOX NEW WORK PLANS
HS-H1.2 ROOF HVAC PLAN

ELECTRICAL
HS-E0.1 ROOF ELECTRICAL DEMOLITION PLAN
HS-E1.1 GROUND FLOOR POWER & F.A. PLAN
HS-E1.2 FIRST FLOOR POWER & F.A. PLAN
HS-E1.3 ROOF ELECTRICAL POWER PLAN
HS-E3.1 SCHEDULES & DETAILS
HS-E4.1 SITE ELECTRIC UTILITY PLAN - WEST
HS-E4.2 SITE ELECTRIC UTILITY PLAN – EAST

PLUMBING
HS-P0.1 1ST FLOOR & ROOF DEMOLITION PLANS
HS-P1.1 1ST FLOOR & ROOF NEW WORK PLANS

TECHNOLOGY
HS-T1.1 FIRST FLOOR TECHNOLOGY PLAN

PRESS BOX

ARCHITECTURAL

PB-A1.1	PRESS BOX
PB-A1.2	PRESS BOX MANUFACTURER DETAILS
PB-A1.3	PRESS BOX MANUFACTURER DETAILS

ELECTRICAL

PB-E1.1	PRESS BOX ELECTRICAL PLAN

TECHNOLOGY

PB-T1.1	PRESS BOX TECHNOLOGY PLAN

INTERMEDIATE JUNIOR HIGH SCHOOL

CODE COMPLIANCE

IJ-CO1.1	FIRST FLOOR CODE COMPLIANCE PLAN
IJ-CO1.2	SECOND FLOOR CODE COMPLIANCE PLAN
IJ-CO1.3	SITE CODE COMPLIANCE PLAN

ABATEMENT

IJ-AB1.1	FIRST FOOR ABATEMENT PLAN - AREA A
IJ-AB1.2	FIRST FLOOR ABATEMENT PLAN - AREA B
IJ-AB1.3	FIRST FLOOR ABATEMENT PLAN - AREA C
IJ-AB1.4	FIRST FLOOR ABATEMENT PLAN - AREA D
IJ-AB1.5	FIRST FLOOR ABATEMENT PLAN - AREA E
IJ-AB1.6	SECOND FLOOR ABATEMENT PLAN - AREA A
IJ-AB1.7	SECOND FLOOR ABATEMENT PLAN - AREA B
IJ-AB1.8	SECOND FLOOR ABATEMENT PLAN - AREA D & E

SITE

IJ-L0.1	SITE EXISTING CONDITIONS PLAN
IJ-L1.1	SITE DEMOLITION PLAN – SOUTH
IJ-L1.2	SITE DEMOLITION PLAN - NORTH
IJ-L2.1	SITE IMPROVEMENT PLAN - SOUTH
IJ-L2.2	SITE IMPROVEMENT PLAN - NORTH
IJ-L3.1	SITE LAYOUT PLAN - SOUTH
IJ-L3.2	SITE LAYOUT PLAN - NORTH
IJ-L4.1	SITE GRADING PLAN – SOUTH
IJ-L5.1	SITE UTILITY PLAN – SOUTH
IJ-L6.1	SITE ELECTRIC UTILITY PLAN – SOUTH
IJ-L6.2	SITE ELECTRIC UTILITY PLAN – NORTH
IJ-L6.3	SITE E&SC NOTES AND DETAILS

IJ-L7.1 SITE DETAILS
IJ-L7.2 UTILITY DETAILS
IJ-L7.3 STORMWATER DETAILS
IJ-L7.4 STORMWATER DETAILS
IJ-L7.5 NYSDOT NOTES AND DETAILS

ARCHITECTURAL
IJ-A0.1 FIRST FLOOR DEMOLITION PLAN - AREA A
IJ-A0.2 FIRST FLOOR DEMOLITION PLAN - AREA B
IJ-A0.3 FIRST FLOOR DEMOLITION PLAN - AREA C
IJ-A0.4 FIRST FLOOR DEMOLITION PLAN - AREA D
IJ-A0.5 FIRST FLOOR DEMOLITION PLAN - AREA E
IJ-A0.6 SECOND FLOOR DEMOLITION PLAN - AREA A
IJ-A0.7 SECOND FLOOR DEMOLITION PLAN - AREA B
IJ-A0.8 SECOND FLOOR DEMOLITION PLAN - AREA D & E
IJ-A1.1 FIRST FLOOR PLAN - AREA A
IJ-A1.2 FIRST FLOOR PLAN - AREA B
IJ-A1.3 FIRST FLOOR PLAN - AREA C
IJ-A1.4 FIRST FLOOR PLAN - AREA D
IJ-A1.5 FIRST FLOOR PLAN - AREA E
IJ-A1.6 SECOND FLOOR PLAN - AREA A
IJ-A1.7 SECOND FLOOR PLAN - AREA B
IJ-A1.8 SECOND FLOOR PLAN - AREA D & E
IJ-A1.9 ROOF PLAN - AREA A
IJ-A1.10 ROOF PLAN - AREA B
IJ-A1.11 ROOF PLAN - AREA C
IJ-A1.12 ROOF PLAN - AREA D
IJ-A1.13 ROOF DETAILS
IJ-A1.14 SKYLIGHT DETAILS - ALT. #1
IJ-A2.1 FIRST FLOOR REFLECTED CEILING PLAN - AREA A
IJ-A2.2 FIRST FLOOR REFLECTED CEILING PLAN - AREA C
IJ-A2.3 FIRST FLOOR REFLECTED CEILING PLAN - AREA D
IJ-A2.4 FIRST FLOOR REFLECTED CEILING PLAN - AREA E
IJ-A2.5 SECOND FLOOR REFLECTED CEILING PLAN - AREAS A & B
IJ-A2.6 SECOND FLOOR REFLECTED CEILING PLAN - AREA D & E
IJ-A2.7 CEILING DETAILS
IJ-A3.1 EXTERIOR ELEVATIONS
IJ-A3.2 EXTERIOR ELEVATIONS
IJ-A5.1 ENLARGED TOILET ROOM PLANS
IJ-A5.2 ENLARGED PLANS & INTERIOR ELEVATIONS
IJ-A5.3 ENLARGED INTERMEDIATE LIBRARY PLAN
IJ-A5.4 ENLARGED JUNIOR HIGH LIBRARY PLAN
IJ-A5.5 INTERMEDIATE & JUNIOR LIBRARY CIRCULATION DESK PLAN
IJ-A6.1 DOOR SCHEDULE & DETAILS
IJ-A6.2 WINDOW SCHEDULE & DETAILS
IJ-A7.1 PARTITION TYPES & DETAILS
IJ-A8.1 FIRST FLOOR FINISH PLAN - AREA A
IJ-A8.2 FIRST FLOOR FINISH PLAN - AREA C

IJ-A8.3 FIRST & SECOND FLOOR FINISH PLAN - AREAS D&E
IJ-A8.4 FIRST FLOOR WALL FINISH PLAN - AREA A
IJ-A8.5 FIRST FLOOR WALL FINISH PLAN - AREA B
IJ-A8.6 FIRST FLOOR WALL FINISH PLAN - AREA C
IJ-A8.7 FIRST FLOOR WALL FINISH PLAN - AREA D
IJ-A8.8 FIRST FLOOR WALL FINISH PLAN - AREA E
IJ-A8.9 SECOND FLOOR WALL FINISH PLAN - AREA A
IJ-A8.10 SECOND FLOOR WALL FINISH PLAN - AREA D & E
IJ-A9.1 INTERIOR FINISH & SIGNAGE SCHEDULES

MECHANICAL
IJ-H0.1 FIRST FLOOR HVAC DEMOLITION PLAN
IJ-H0.2 FIRST FLOOR HVAC DEMO PLAN - PARTIAL AREA C, D & E
IJ-H0.3 SECOND FLOOR HVAC DEMO PLAN - PARTIAL AREA C, D & E
IJ-H0.4 ROOF HVAC DEMOLITION PLAN
IJ-H1.1 FIRST FLOOR NEW WORK PLAN
IJ-H1.2 FIRST FLOOR HVAC PLAN - PARTIAL AREA C, D & E
IJ-H1.3 SECOND FLOOR HVAC NEW WORK PLAN - PARTIAL AREA C, D & E
IJ-H1.4 ROOF HVAC PLAN
IJ-H1.5 FIRST FLOOR RADATION CONTRO PLAN
IJ-H1.6 SECOND FLOOR RADIATION CONTROL PLAN
IJ-H2.1 FIRST FLOOR PIPING PLAN
IJ-H3.1 SCHEDULES
IJ-H4.1 DETAILS

ELECTRICAL
IJ-E0.1 FIRST FLOOR DEMOLITION PLAN - AREA A
IJ-E0.2 FIRST FLOOR DEMOLITION PLAN - AREA B
IJ-E0.3 FIRST FLOOR DEMOLITION PLAN - AREA C
IJ-E0.4 FIRST FLOOR DEMOLITION PLAN - AREA D
IJ-E0.5 FIRST FLOOR DEMOLITION PLAN - AREA E
IJ-E0.6 SECOND FLOOR DEMOLITION PLAN - AREA A
IJ-E0.7 SECOND FLOOR DEMOLITION PLAN - AREA D & E
IJ-E0.8 ROOF ELECTRICAL DEMOLITION PLAN
IJ-E1.1 FIRST FLOOR POWER PLAN - AREA A
IJ-E1.2 FIRST FLOOR POWER PLAN - AREA B
IJ-E1.3 FIRST FLOOR POWER PLAN - AREA C
IJ-E1.4 FIRST FLOOR POWER PLAN - AREA D
IJ-E1.5 FIRST FLOOR POWER PLAN - AREA E
IJ-E1.6 SECOND FLOOR POWER PLAN - AREA A
IJ-E1.7 SECOND FLOOR POWER PLAN - AREA D & E
IJ-E1.8 ROOF ELECTRICAL POWER PLAN
IJ-E2.1 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA A
IJ-E2.2 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA B
IJ-E2.3 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA C
IJ-E2.4 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA D
IJ-E2.5 FIRST FLOOR LIGHTING & FIRE ALARM PLAN - AREA E
IJ-E2.6 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA A
IJ-E2.7 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA B

IJ-E2.8 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA C
IJ-E2.9 SECOND FLOOR LIGHTING & FIRE ALARM PLAN - AREA D & E
IJ-E3.1 SCHEDULES & DETAILS
IJ-E4.1 SITE ELECTRIC UTILITY PLAN - SOUTH
IJ-E4.2 SITE ELECTRIC UTILITY PLAN – NORTH

PLUMBING
IJ-P0.1 FIRST & SECOND FLOOR DEMOLITION PLANS
IJ-P0.2 PLUMBING ROOF DEMO PLAN
IJ-P1.1 FIRST & SECOND FLOOR SANITARY & STORM PLANS
IJ-P1.2 FIRST & SECOND FLOOR DOMESTIC PLANS
IJ-P1.3 ROOF PLUMBING PLAN
IJ-P3.1 SCHEDULES & SCHEMATICS

TECHNOLOGY
IJ-T1.1 FIRST FLOOR TECHNOLOGY KEY PLAN
IJ-T1.2 SECOND FLOOR TECHNOLOGY KEY PLAN
IJ-T1.3 FIRST FLOOR TECHNOLOGY PLAN - PARTIAL AREA A
IJ-T1.4 1ST & 2ND FL TECHNOLOGY - PARTIAL AREA C & D
IJ-T1.5 FIRST FLOOR TECHNOLOGY PLAN - PARTIAL AREA E

THEATRICAL LIGHTING
IJ-TL0.1 THEATRICAL LIGHTING SYSTEM REMOVAL PLANS
IJ-TL1.1 THEATRICAL LIGHTING SYSTEM CONTROL PLANS
IJ-TL1.2 THEATRICAL LIGHTING SYSTEM HOUSELIGHTING PLAN & SECTION
IJ-TL2.1 THEATRICAL LIGHTING SYSTEM SINGLE LINE FLOW DIAGRAM
IJ-TL2.2 THEATRICAL LIGHTING SYSTEM NETWORK SINGLE LINE FLOW DIAGRAM
IJ-TL3.1 THEATRICAL LIGHTING SYSTEM DETAILS
IJ-TL3.2 THEATRICAL LIGHTING SYSTEM DETAILS
IJ-TL3.3 THEATRICAL LIGHTING SYSTEM DETAILS
IJ-TL3.4 THEATRICAL LIGHTING SYSTEM DETAILS
IJ-TL3.5 THEATRICAL LIGHTING SYSTEM DETAILS
IJ-TL4.1 THEATRICAL LIGHTING SYSTEM NOTES & SYMBOLS KEYS
IJ-TL4.2 THEATRICAL LIGHTING SYSTEM NOTES & SYMBOLS KEYS

AUDITORIUM SOUND
IJ-TS1.1 AUDITORIUM SOUND SYSTEM PLANS
IJ-TS1.2 AUDITORIUM SPEAKER AIMING PLAN & SECTION
IJ-TS2.1 AUDITORIUM SOUND SYSTEM SINGLE LINE FLOW DIAGRAM
IJ-TS3.1 AUDITORIUM SOUND SYSTEM DETAILS
IJ-TS4.1 AUDITORIUM SOUND SYSTEM NOTES & SYMBOLS KEYS

SECTION 00 11 13
ADVERTISEMENT TO BID

NOTICE IS HEREBY GIVEN that the Board of Education, Homer Central School District, herein called the Owner, invites sealed Bids, submitted in duplicate, in accordance with Drawings, Specifications and other Bidding and Contract Document, for the following bid items;

- Publicly Bid Prime Contractor Contracts
  - General Construction
  - Plumbing
  - HVAC
  - Electrical
  - Site Work
- Cooperative Purchase Contracts
  - Roofing
  - Playground Installation
  - HS Pressbox
- Procurement Contract for Equipment
  - HVAC Temperature Controls Equipment & Programming

FOR: HOMER CENTRAL SCHOOL DISTRICT
80 South West Road
Homer, New York, 13077

PROJECT TITLE

High School:	SED Project No: 11-07-01-06-0-002-016
Intermediate/Junior High School:	SED Project No: 11-07-01-06-0-007-013
Elementary School	SED Project No: 11-07-01-06-0-006-013
Existing Pressbox	SED Project No: 11-07-01-06-7-015-003
New Pressbox	SED Project No: 11-07-01-06-7-023-001

Prime Contract Bid Opening: The Owner's Representative will receive sealed bids at the District Office at Homer Central School District, Attn: Mike Falls, 80 S West Road, Homer, NY 13077 on **February, 2 2023 at 3:30 P.M. (local time)** and then following receipt of bids at said time and place, will be publicly opened and read aloud at the Homer Central School HTEC Room in the Bus Garage Building. Any bid received after the designated time will be returned unopened, and will not be considered.

Prime Contract Administrative Pre-Bid Conference: A pre-bid conference will be held on **January 12, 2023 at 3:00 P.M. (local time)** at Homer High School HTEC Room at the Bus Garage Building 80 S West Road, Homer, NY 13077. All prospective bidders are requested to attend this meeting.

Roofing Procurement Contract Administrative Pre-Proposal Briefing: A pre-bid conference will be held on **January 13, 2023 at 11:00 A.M. (local time)** at Homer High School HTEC Room Bus Garage Building at 80 S West Road, Homer, NY 13077. All prospective bidders are requested to attend this meeting.

Building Tours: Building tours will be conducted after the meeting, all prospective bidders are encouraged to tour the buildings and get familiar with the facilities and scope of work.

The Instructions to Bidders, Forms of Proposal, Drawings and Specifications may be examined at the following offices:

Homer Central School District, 80 South West Road, Homer, NY 13077
LeChase Construction Services LLC, 609 Erie Boulevard West, Syracuse, New York 13204
Hunt Engineers, Architects and Land Surveyors, 100 Hunt Center, Horseheads, NY 14845
Associated Building Contractors, 535 Vestal Parkway West, Suite One, Vestal, NY 13850

SECTION 00 11 13
ADVERTISEMENT TO BID

Builder's Exchange of Rochester, 180 Linden Oaks, Suite 100, Rochester, NY 14625-2737
Construction Exchange of Buffalo & Western New York, 2660 Williams Streeet, Cheektowaga, NY 14227
Syracuse Builders Exchange, 6563 Ridings Rd., Syracuse, N.Y. 13206
Southern Tier Builders Association, 65 E. Main St., Falconer, NY 14733
McGraw-Hill Construction, 3315 Central Ave, Hot Springs, AR, 71913 http://dodgeprojects.construction.com
Reed Construction Data, Subscribers Only: Documents can be viewed electronically at the subscriber website: www.reedconstructiondata.com / http://www.reedconstructiondata.com

Copies of the Bidding Documents may be obtained at: Dataflow – Corning Office, 100 Hunt Center, Horseheads NY 14845 Tel. (607) 562-2196, Fax (607) 562-3214 Email: corning@godataflow.com Website: www.godataflow.com

Bid Documents are also available for electronic viewing at www.HUNT-EASplans.com, including an up-to-date plan holders list. Electronic (PDF) files are also available for a **non-refundable payment of $25.00.** Checks shall be made payable to Homer Central School District.

Upon deposit of One Hundred dollars $100.00) per set. Checks for deposit shall be made payable to of Homer Central School District. Cash will not be acceptable as a deposit for the Contract Documents. A Bidder whose bid is accompanied by a certified check or other security in accordance with the bidding requirements and public advertisement and who returns a complete set of Bidding Documents in good condition within thirty (30) days following the award of the contract covered by such bidding documents, or the rejection of such bid, shall receive a refund of the full amount of the deposit for one (1) copy of the Bidding Documents, less the actual cost of reproduction of the Bidding Documents, shall be made for the return of all other copies of the Bidding Documents in good condition within thirty (30) days following the award of the contract or rejection of the bids covered by such Bidding Documents. Any complete or partial sets required in excess of maximum issue are to be obtained by the interested parties, at their cost, with no money returned.

Bidding documents will be delivered by UPS Ground services upon request and receipt of an additional non-refundable delivery and handling charge of $25.00 per set, payable by separate check to of Hunt Engineers/Architects/Surveyors). Sets can also be overnight delivered to upstate NY locations for a non-refundable delivery and handling charge of $75.00 per set. All requests for sets to be delivered to locations outside of upstate NY will incur an additional shipping charge based on the metering increase for those locations.

Prospective subcontractors and material suppliers may obtain Bidding Documents they require by payment of printing and mailing costs.

Attention of the Bidder is particularly called to the Owner's sales tax exemption, the requirements as to conditions of employment to be observed and the minimum wage rates o be paid under the contract. In addition, the bidding Documents fo this project contain detailed requirements for the qualification of Bidders. These include, among other things, rigid bonding and insurance requirements, financial statements, bank references, lists of lawsuits, arbitrations or other proceedings in which the Bidder has bee named as a party, a statement of surety's intent to issue Performance and Payment Bonds, and a description of other projects of similar size and scope completed by the Bidder.

Bids shall be prepared as set forth in "Instructions to Bidders", enclosed in a sealed envelope bearing on its face the name and address of the Bidder and the title of the Work to which the bid enclosed relates.

As bid security, each proposal shall be accompanied by a certified check or Bid Bond made out to the Owner, in an amount not less than five percent (5%) of the Base Bid amount, subject to the terms and conditions described in the "Instructions To Bidders."

The Owner reserves the right to waive any information in, or to reject, any and all bids. No bidder may withdraw his proposal within forty-five (45) days after the actual date of the opening thereof.

SECTION 00 11 13
ADVERTISEMENT TO BID

Bids must be prepared and submitted in accordance with the Instructions to Bidders.

The successful Bidder must furnish a Performance Bond and a Labor and Material Payment Bond in accordance with the Instructions to Bidders.

Attention of Bidders is particularly directed to the requirements of the conditions of employment to be observed and the prevailing hourly wage rates and supplements to be paid under the Contract.

The Owner reserves the right to reject any or all bids, and the right to waive any informality in any bid.

Board of Education
HOMER CENTRAL SCHOOL DISTRICT
80 S. West Street
Post Office Box 500
Homer, New York 13077

SECTION 00 12 00

REQUEST FOR INFORMATION

DATE: _____.

CONTRACT: _____.

DRAWING: _____.

SPECIFICATION SECTION: _____.

REQUEST: INCLUDE ATTACHMENTS AS REQUIRED TO CLARIFY QUESTION:

_____.

_____.

_____.

_____.

_____.

_____.

Requested by: _____.
Name / Company Name

Contact Information: Phone _____ E-mail: _____.

ANSWER:

_____.

_____.

_____.

_____.

_____.

By: _____ Date: _____ RFI #: _____.

SECTION 00 21 00
INSTRUCTIONS TO BIDDERS

1.0 PROJECT

A. Homer High School scope includes building-wide selective demolition and renovations with some infrastructure improvements, no additions; Homer Intermediate/Jr. High scope includes building-wide selective demolition and renovations, no additions; Homer Elementary scope includes selective building-wide renovations, no additions.

B. The scope of the work will be administered under multiple prime contracts. As described herein, this is Bid Package which generally consists of, but not limited to the following scope: General Construction; Heating, Ventilation & Air Conditioning (MC / HVAC); Plumbing, Electrical and Site Work.

2.0 ARCHITECT/ENGINEER

A. Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park / 100 Hunt Center
Horseheads, NY 14845
Telephone – 607-358-1000 Fax – 607-358-1800

3.0 CONSTRUCTION MANAGER

A. LeChase Construction Services LLC
609 Erie Boulevard West
Syracuse, NY 13204
Telephone – 315-423-0015 Fax – 315-423-0054

4.0 DEFINITIONS

A. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement for Bids, Instructions to Bidders, Bid Forms, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, conditions of the Contract (General, Supplementary and other conditions), Drawings, Specifications and all Addenda issued prior to the execution of the Contract.

B. Definitions set forth in the General conditions of the Contract for Construction, AIA Document A232/CMa, and in other Contact Documents are applicable to the Bidding Documents.

C. Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding documents by additions, deletions, clarifications or corrections.

D. A Bid is a complete and properly signed proposal to perform the Work for the sums stipulated therein, submitted in accordance with the Contract Documents.

E. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

F. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

1. Alternates are described in the specifications and provided for in the Bid Form. The Price of the Bid for each Alternate will be the amount to be added or deducted from the price of the Base Bid if the Owner selects the Alternate.

G. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

H. A Bidder is a person or entity who submits a Bid.

I. A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

5.0 BIDDER'S REPRESENTATIONS

A. By making a bid, the Bidder represents and warrants to Owner that:

1. Bidder is, and will be, financially responsible and has, and will have, sufficient liquidity to meet its financial responsibilities under the contract and for all other projects in which Bidder is or may become involved.

2. Bidder has carefully examined the Bidding Documents and familiarized themselves with the conditions which will be encountered relating to the character, quality, and quantity of the Work to be performed and the materials to be furnished, or that may in any manner affect the cost, progress, or performance of the Work, or deems such visit and examination to be unnecessary.

3. Bidder has read and understands the Bidding Documents, to the extent that such documentation relates to the Work for which the Bid is submitted.

4. From Bidder's investigation, Bidder has satisfied itself as to the nature and location of the proposed work, the general and local conditions, federal, state and local laws, ordinances, rules and regulations that may in any manner affect the cost, progress, or performance of the Work, the employment of labor thereof, and all other matters which may in any way affect the work or its performance and carefully correlate the Bidder's observations with the requirements of the Bidding Documents. Contractors will not be given extra payments for conditions which can be determined by examining the Bid Documents and being familiar with the Site.

5. The Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception. Claims for additional compensation and/or extension of time relating to Bidder's noncompliance with its representation and warranties in the preceding sentence will not be allowed.

6. The Owner will make available to the Bidder information that may be available as to the subsurface conditions at the work site. Such information shall be given, as the best factual information available, without the assumption of responsibility by the Owner for its accuracy or for any conclusions that the bidder shall, at his own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his bid for performance of the Work in accordance with the Bidding Documents. On request, the Owner will provide the Bidder access to the site to conduct such investigations and tests.

7. The failure or omission of the Bidder to comply with these requirements will in no way relieve the Bidder from any obligation with the respect to its bid.

6.0 BIDDING DOCUMENTS

A. Copies:
   1. Bidders may obtain complete sets of the Bidding Documents form the location designated in the Advertisement for Bids in the quantity and for the deposit sum stated therein. Upon returning sets of Bidding Documents to the location designated and as described in the Advertisement for Bids, deposits will be refunded as stated therein.

   2. Bidders shall use complete sets of Bidding Documents in preparing Bids; the Owner, Construction Manger nor the Architect assume responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

   3. The Owner, Architect and Construction Manager may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

B. Interpretation Or Correction Of Bidding Documents:
   1. The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work, for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

   2. Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect and the Construction Manager at least seven days prior to the date for receipt of Bids.

   3. Interpretations, corrections and changes of the Bidding Documents will be made by written Addendum. Interpretations, corrections, and changes of the Bidding Documents made in any other manner, will not be binding, and bidders shall not rely upon them. No oral interpretation will be made to any Bidder as to the meaning of the Bidding Documents or any part thereof.

C. Addenda:
   1. Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

   2. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

   3. Addenda will be issued no later than five (5) days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

   4. Each bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt on the Bid Form.

D. Equivalents:
   1. Equivalents relate to the Bidding Process and may be freely bid. Bidders bear the risk of whether the equivalents which are bid will be accepted.

   2. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution or equivalent. The absence of the "or equal" clause is not meant to exclude competition in any way; similar products of other manufacturers which are equal in quality, performance and equally adaptable for the intended purposes, as determined by the Architect/Engineer.

   3. No equivalent will be considered prior to award of contract unless the Bidder submits a complete equivalent listing to the Architect within two days following the date for receipt of Bids. Such equivalents shall include the name of the material or equipment for which it is to be substituted as an equivalent and a complete description of the proposed equivalent including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed equivalent would require, shall be included. The burden of proof of the merit of the proposed equivalent is upon the proposer. The Architect and the Engineer shall be the sole determiner of equivalency decision of approval or disapproval of a proposed equivalent shall be final.

   4. If the Architect approves a proposed equivalent prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

   5. Substitutions relate to post Contract Award. No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

7.0 BIDDING PROCEDURES

A. Preparation Of Bids:
   1. Bids shall be submitted on the forms included in the Bidding Documents.

   2. All blank spaces on the bid form shall be filled in legibly, in ink or typewritten. Sums shall be expressed in both words and figures. In case of discrepancy, the amount shown in written words shall be binding on the Bidder.

   3. Interlineations, alterations, and erasures must be initialed by the signer of the Bid.

   4. All requested Alternates shall be bid. If no change in the Base Bid is required, enter “NO CHANGE”.

   5. The Bidder shall submit Bid in accordance with the Instructions to the Bidders and shall not make any changes in the wording of the bid form or make any stipulations or qualify the Bid in any manner.

   6. Prior to the receipt of Bids, Addenda will be mailed or delivered to each Bidder of record as having received the Bidding Documents and will be available for inspection wherever the Bidding Documents are kept available for that purpose. The Bidder shall note the receipt of Addenda in the spaces provided on the bid form by entering the number and

the date of each Addendum. If no Addenda have been received, insert the word "NONE". Failure to acknowledge Addenda shall be sufficient cause for rejection of the bid.

7. The Non-Collusive Bidding Certification required by Section 103-d of the General Municipal Law is included in the bid form.

8. Should a Bidder wish to submit proposals for more than one contract, the Bidder shall prepare all separate forms for each Contract.

9. Each Copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder and a statement that the Bidder is a sole proprietor, partnership, corporation or other legal entity. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a Contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed.

B. Bid Security:
   1. Each bid shall be accompanied by a bid security which shall not be less than five percent (5%) of the Base Bid. Bid security shall be submitted in the form of a Cashier's Check, Certified Check or Bid Bond in a form acceptable to the Owner. A bid bond shall be secured by a surety company authorized to business in the State of New York as a surety. No bid will be considered unless it is accompanied by the required bid security. Certified checks or Cashier's Checks must be made payable as indicated in the Advertisement for Bids.

   2. The Cashier's Checks or Certified Checks of all bidders, except the three lowest, will be returned within three days after the formal opening of the Bids. The remaining Cashier's or Certified Checks or substituted bid bonds will be returned within 48 hours after the contract has been executed, or if not such contract has been executed, within forty-five (45) days after the bid opening.

   3. The successful Prime Contract bidders, upon failure or refusal to execute and deliver the contract and bonds required within ten (10) days after receiving notice of acceptance of the Bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with the Bid.

   4. The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds have been furnished, or (b) forty-five (45) days have elapsed from the bid date so the Bids may be withdrawn or (c) all Bids have been rejected.

8.0 SUBMISSION OF BIDS

A. All copies of the Bid, bid security and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the bids and shall be identified with the Project Name, the Bidder's Name and Address and the Designated Portion of Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

B. Bids shall be deposited at the designated location prior to the time and dated for receipt of Bids as described in the Advertisement for Bids.

C. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

D. Oral, telephonic telegraphic, facsimile or other electronically transmitted bids will not be considered.

9.0 MODIFICATION OR WITHDRAWAL OF BID

A. A Bid may not be modified, withdrawn or canceled by the Bidder during the 45 day time period following the date of the Bid Opening.

B. Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date and Date and Time stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

C. Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instruction to Bidders.

D. Bid security shall be in an amount sufficient for the Bid as resubmitted.

10.0 CONSIDERATION OF BIDS

A. Opening Of Bids:
   1. As stipulated in the Advertisement for Bids, the properly identified Bids received on time will be opened and read aloud.

B. Rejection Of Bids:
   1. The Owner shall have the right to reject any or all Bids; to reject a Bid not accompanied by the required bid security or by other data required by the Bidding Documents; to reject a Bid which is in any way incomplete or irregular; and to waive any informality in a Bid.

C. Acceptance Of Bid (Award):
   1. The award of Contract will be made by written Notice of Award (Letter of Intent) signed by a duly authorized representative of the Owner, and no other act of the Owner shall constitute the acceptance of a Bid.

   2. If a Contract is awarded, it will be awarded to the lowest responsible Bidder as determined by the Owner.

   3. The Owner shall have the right to accept Alternates in any order or combination, and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates accepted. Alternate values are submitted for the term of the contract and award of any alternate may be requested during the duration of this contract at no additional cost to the Owner provided the sequence of work is logical.

   4. The acceptance of a bid shall bind the successful Bidder to execute the Contract as provided in paragraph 16.0 of the Instructions to Bidders.

SECTION 00 21 00
INSTRUCTIONS TO BIDDERS

11.0 POST-BID INFORMATION

A. Qualification Statement Submittals:

1. The Owner may make such investigation as he deems necessary to determine the ability of the bidder to perform the work and the bidder shall furnish to the Owner all information and data for this purpose as the Owner may request. The Owner reserves the right, in its sole discretion, to reject any bid if the evidence submitted by or investigation of such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated herein within the time limit agreed upon.

2. The ability of any bidder to secure performance and payment bonds shall not be the sole method of determining the Bidder to be qualified.

3. Each of the apparent Three (3) Low Bidders shall submit to the Construction Manager, within 48 hours after the time of Bid Opening, the following:

    a. A properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.
    b. A designation of the Work to be performed by the Bidder with his own forces.
    c. The proprietary names and the suppliers of principal items or systems of materials and equipment proposed for the Work.
    d. A list of names of the Subcontractors or other persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
    e. A complete listing of equivalents

4. The apparent Low Bidder shall submit the following to the Owner within ten (10) calendar days following the receipt of the Notification of Award / Letter of Intent.

    a. Latest available Dun & Bradstreet report of the Bidder, dated.
    b. Most recent audited financial statement covering a period of at least twelve (12) months.
    c. 10K statement, if applicable.
    d. Statement of bankruptcy status, if the firm is bankrupt or has previously filed for bankruptcy or has been declared bankrupt.
    e. Bank reference, including name and telephone number of bank officer.
    f. List of principal owners, officers and directors of the Bidder, their addresses and telephone numbers.
    g. List of any pending claims against insurance of $25,000 or more, or any claims settled within the last three (3) years. State whether such claim is pending or settled.
    h. List of any litigation, including arbitration proceedings, in which the Bidder has been named as a party within the last five (5) years and the parties thereto. State whether such litigation or arbitration is pending, settled or adjudicated and, if adjudicated, the result.
    i. List of all projects in progress on the date bids are due or completed within the last eighteen (18) calendar months of the date bids are due. Include names of contact persons, addresses and telephone numbers.

j. Any and all certificates, licenses or permits required by the Contractor or its employees to do the Work of this Project consistent with all applicable laws.
k. A notarized statement of any and all violations by the Bidder of statutes, regulations, ordinances or other rules related to the Work of this or similar projects.
l. A notarized list of all names under which the Bidder has done business in the past five (5) years.

5. The Bidder will be required to establish to the satisfaction of the Architect, Construction Manager and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

6. Prior to the execution of the Contract, the Architect will notify the Bidder in writing if the Owner, Construction Manager or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner, Construction Manager or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

12.0 INSURANCE REQUIREMENTS

A. The successful Bidder will be required to maintain General Liability, Automobile Liability, Excess "Umbrella" Liability, and Worker' Compensation and Employers' Liability insurance as provided in accordance with Specification Section
00 73 00 Insurance Requirements.

13.0 BONDING REQUIREMENTS

A. The successful Bidder will be required, prior to the execution of the contract, to furnish the following surety bonds issued by a surety company approved by the Owner and authorized to do business in the State of New York as a surety:

1. Performance Bond - In an amount not less than One Hundred Percent (100%) of the Contract Price.

2. Labor and Material Payment Bond - In an amount not less than One Hundred Percent (100%) of the Contract Price.

3. Guarantee Bond – In addition to the Performance and Labor and Material Payment Bonds specified above, each contractor shall, upon receipt of his final certificate, furnish and deliver to the Architect a standard guarantee bond covering replacement of defective materials and workmanship for a period of one year at no cost to the Owner. Effective date shall be the date of the final certificate.

B. The premiums for such bonds shall be paid by the Bidder. The bonds shall be written on the format provided in Specification Section 00 73 20 – Bonding Requirements. The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney indicating the monetary limit of such power.

C. The bonds shall be dated on or after the date of the Contract.

D. The Bidder shall deliver the required bonds to the Owner not later than ten (10) days following the date of the execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered to in accordance with this Section 00 73 20 – Bonding Requirements.

14.0 WAGE RATES AND SUPPLEMENTS

A. All Contractors and Subcontractors are required to pay the prevailing hourly wage rates and the prevailing hourly supplements for the Project as determined by the New York State Department of Labor, in accordance with the provisions of Section 220 of the Labor Law of the State of New York. Schedules of the wage rates and supplements are included in the Bidding Documents and form a part of the Contract Documents. In preparing its Bid, the Bidder must consider that the wage rates and supplements may be increased during the term of the Project, and projected increases should be included in the Bid for the entire project duration.

15.0 SALES TAX EXEMPTION

A. The Owner is exempt from payment of sales and compensating use taxes of the State of New York and of cities and counties within the State of New York. Sales taxes on materials to be incorporated in the completed project which are sold to the Owner pursuant to the provisions of the Contract shall not be included in the bid price. The exemption does not, however, apply to tools, machinery and equipment or to the property purchased by or leased by or to a Contractor or a Subcontractor, or to supplies or materials not incorporated in the complete project. An exemption certificate will be supplied to the Successful Bidder upon Award of Contract.

16.0 EXECUTION OF CONTRACT; COMMENCEMENT OF WORK

A. The Bidder to whom the award is made shall assist and cooperate with the Owner, as necessary, in preparing the Agreement for execution by the parties and, within ten (10) days of receipt of the Agreement, shall execute the Agreement and return it to the Owner together with the required Performance Bond, Labor and Material Payment Bond and Certificates of Insurance. The Agreement for the Work will be written on AIA Document A101/CMa, Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum.

B. Notwithstanding any delay in the preparation and execution of the Agreement, the successful Bidder shall be prepared, upon receipt of the Notice of Award / Letter of Intent, to provide the required Bonds and Certificates of Insurance and to commence work within ten (10) days following the date stipulated on the Notice of Award / Letter of Intent.

END OF SECTION

AIA® Document A701™ – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

THE OWNER:
(Name, legal status, address, and other information)

Homer Central School District
88 South West Road
Homer, NY 13077

THE ARCHITECT:
(Name, legal status, address, and other information)

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

TABLE OF ARTICLES

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

Bidding Documents are available in paper copy or electronic format, as outlined in the Advertisement for Bids.

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

Requests shall be on form provided in the Bidding Documents, and submitted electronically, as outlined in the Advertisement for Bids.

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

Addenda, where practical, will be transmitted electronically regardless of how Bidding Documents were received. In all other instances, Addenda will be issued in paper copy.

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

§ 3.5 Or Equal Clause

§ 3.5.1 The use of manufacturer's brand names, catalog numbers, and similar proprietary identifying data in the contract documents are not intended to eliminate from consideration products that are equivalent in quality, appearance and function to those specified. Where, in the specifications, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal, and the contractor may select one of those items. Further, the contractor may be requested to submit information describing in specific detail, wherein the bid material differs from the quality and performance required by the base specifications, and such other information as may be required by the Architect. The risk of acceptance of bid equivalents is the responsibility of the contractor.

§ 3.5.2 If the contractor desires to use any kind, type, brand, or manufacturer of material other than those named in the Specification, he shall indicate in writing on the form included in Specification Section 00 44 00 Equivalent Listing, prior to award of contract, that kind, type, brand, or manufacture is included in the base and/or alternate bids for the specified item(s).

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal

affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:
(Insert the form and amount of bid security.)

Bid security shall be in the amount of 5% of the bid amount, cash will not be accepted as bid security. Bid security shall be in one of the following forms:

a. Bid Bond from a company listed on Treasury Circular 570.
b. Certified Check.
c. Bank Check.

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning 45 days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:
(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

Bids shall be submitted in paper copy as outlined in the Advertisement for Bids, and in accordance with Article 4 of these Instructions.

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving

party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:
(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

Notwithstanding any other provisions or regulations, the bid security shall be returned to the Bidder, at the address listed on the Bid Form as soon as is reasonable and practical.

§ 4.4.4 The stipulated time period after the receipt of bids during which bids may not be withdrawn is 45 calendar days. The stipulated time period within which alternates may not be withdrawn by the successful bidder is 120 days after acceptance of the bid.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.1.1 A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

.4 a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 20 00.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. **The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.**

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda:

Number	Date	Pages

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 09:20:49 ET on 07/29/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ – 2018, Instructions to Bidders, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 00 31 32
GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUBSURFACE INVESTIGATION REPORT

A. The following Geotechnical Report, prepared by Terracon Consultants- NY for the Homer Central School District; Report No. PJ5225186, Dated September 2022, for the 2021 Capital Improvement Project, describes the result of the subsurface investigation made on the site. This report and the tabulated results of the borings are included for the Contractor's information only. The Contractor shall determine soil conditions and shall accept conditions as they exist.

B. The data on indicated subsurface conditions are not intended as representation or warranties of the continuity of such conditions between soil borings. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. The data is made available for the convenience of the Contractor.

C. The Contractor is responsible for any conclusions drawn from soil investigation data. If the Contractor prefers not to assume such risk, he is under obligation to employ his own experts to analyze available information. The Contractor is responsible for any consequences resulting from actions taken by the Contractor on conclusions obtained.

PART 2 PRODUCTS - (NOT USED)

PART 3 EXECUTION

3.1 ATTACHMENTS - GEOTECHNICAL REPORT ATTACHED

END OF SECTION

Geotechnical Engineering Report

Homer CSD 2021 Capital Improvements
Homer, Cortland County, New York
September 14, 2022
Terracon Project No. J5225186

Prepared for:
Homer Central School District
Rochester, New York

Prepared by:
Terracon Consultants-NY, Inc.
Rochester, New York

September 14, 2022

Homer Central School District
Street Address
Rochester, New York 14624

Attn: Ms. Sara Kramarik
P: (607) 358-1000
E: kramariks@hunt-eas.com

Re: Geotechnical Engineering Report
Hunt Project No. 2503-036
Homer CSD 2021 Capital Improvements
Town of Homer, Cortland County, New York
Terracon Project No. J5225186

Dear Ms. Kramarik:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PJ5225186 dated January 06, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants-NY, Inc.

Zeru Kiffle, EIT
Staff Engineer

Michele A. Fiorillo, P.E.
Geotechnical Department Manager

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report
Homer CSD 2021 Capital Improvements
Homer, Cortland County, New York
Terracon Project No. J5225186
September 14, 2022

INTRODUCTION
This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed improvements at the existing Homer Elementary School, Homer Senior High School, and Homer Intermediate/Junior High School in the Town of Homer, Cortland County, New York. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Dewatering considerations
- Excavation considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per IBC
- Pavement design and construction
- Frost considerations

Our geotechnical engineering scope of work for this phase of the project included the following:

- A total of 12 test borings were completed to depths ranging from about 11 to 12 feet below the existing ground surface (bgs). In addition, one test boring at the Homer High School was completed at a depth of 37 feet bgs. The locations of the test borings are as follows:
    - 3 test borings (HES-IT1, HES-IT2, and HES-IT5) at the Homer Elementary School
    - 6 test borings (HHS-IT1 through HHS-IT5, and HHS-SB1) at the Homer High School
    - 4 test borings (HIS-IT1, HIS-IT4, HIS-IT6, and HIS-IT8) at the Intermediate/Junior High School
- A total of nine asphalt pavement cores were completed to depths ranging from about 4.3 to 4.6 feet below the existing pavement surface. The asphalt pavement cores were completed as follows:
    - 3 pavement cores (HHS-PC1 through HHS-PC3) at the Homer High School
    - 6 pavement cores (HIS-PC1 through HIS-PC6) at the Intermediate/Junior High School
- A total of eighteen PVC pipes were installed at the three schools to depths ranging from about 9.5 to 10 feet bgs for infiltration testing. Each pipe was installed near the deeper companion boring.
- Geotechnical engineering analysis and preparation of this report

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. Test boring logs, pavement core photologs, and infiltration test results and are presented in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project includes 3 sites in the Town of Homer, Cortland County, New York: ■ Elementary School – 9 Central Park Place, Homer, NY ■ High School – 80 South West Road, Homer, NY ■ Intermediate/Junior High School – 58 Clinton Street, Homer, NY See **Site Location**
Existing Improvements	Existing buildings, athletic fields, parking and drive areas and sidewalks
Current Ground Cover	Asphalt paved parking lot and grass fields
Existing Topography (Based on the topographic site plan provided by HUNT)	Surface elevations (El.): ■ 1,132 feet at the Elementary School ■ 1,143 to 1,148 feet at the High School ■ 1,132 to 1,136 feet at the Intermediate/Junior High School
Geology[1]	The project site in located within the Allegheny Plateau physiographic province. Geological mapping identifies surficial deposits at the project site as outwash sand and gravel. Also, the underlying bedrock is identified as Shale of the Genesee Group (Upper Devonian unit age).

1. References: Fisher, D.W., Isachsen, Y.W., and Rickard, L.V., 1970, Geologic Map of New York State, consisting of 5 sheets: Niagara, Finger Lakes, Hudson-Mohawk, Adirondack, and Lower Hudson, New York State Museum and Science Service, Map and Chart Series No. 15, scale 1: 250,000.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	RFP emailed to Terracon on June 27, 2022.
Project Description and Proposed Structures	The Homer Central School District 2021 District Improvements Project will include the following at all three schools: ■ Full depth replacement of asphalt and subbase at parking areas ■ Underground stormwater systems ■ New and updated storm lateral and storm conveyance system upgrades, other utilities, grading, landscaping, lighting, playground upgrades, and E&SC measures ■ For High School only, a new 500 square feet press box building at the main field 50-yard line
Building Construction	Press Box Building at High School: ■ Masonry wall bearing walls or steel frames ■ Slab on grade floors ■ Concrete foundation
Finished Floor Elevation	Finished floor elevations are expected to be near existing grades to minimize earthwork cut and fill operations to obtain final grades.
Anticipated Loads (Provided by Hunt)	The following loads were provided for the Press Box proposed at the High School: ■ Slabs: 100 psf ■ Column loads: 10 to 20 kips
Grading/Slopes	We anticipate minimal earthwork cut and/or fill operations (i.e. less than 3 feet) may be required to attain proposed grades.
Pavements[1] **(Assumed)**	Assumed traffic is as follows: ■ Light Duty (Parking Areas): 2 equivalent Single Axle Loads (ESAL's) per day ■ Heavy Duty (Passenger and Bus Traffic): 30 ESAL's per day Design Life 20 years

1. Please contact our office if the assumed traffic loads are significantly higher than the loads reported above.

GEOTECHNICAL CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description[1, 2, 3]
1	**Surface**	Topsoil or Asphalt with Aggregate Base Course
3	**Native Soil**	Mixtures of predominantly Silt, Sand and Gravel with Clay (SP; ML; CL-ML; SP-SC; SP-SM); very loose to very dense or soft to medium stiff

1. Topsoil thickness at the explored locations range from 3 to 6 inches
2. Asphalt pavement thickness at the explored locations range from about 3 to 7 inches and underlying aggregate base course thickness range from about 5 to 12 inches.
3. The sampling equipment utilized may preclude sampling particles larger than 2-inches in dimension. Cobbles and or boulders may also be encountered within the native soils.

Bedrock was not encountered at any of the explored locations.

Groundwater Conditions

The boreholes were observed while drilling and at completion for the presence and level of groundwater. The water levels observed in the boreholes can be found on the boring logs in **Exploration Results**. The ground water levels observed in the boreholes are noted on the attached boring logs and are summarized in the following table.

Boring Number[1]	Depth to groundwater (feet)
HHS-SB1	15
HIS-IT1	10
HIS-IT8	11

Groundwater was not encountered in the remaining test borings while drilling or at completion of drilling. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. In addition, perched water can develop over low permeability soil or dense layers. Groundwater levels during

construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Additionally, grade adjustments on and around the site may affect the water table, as may drainage improvements on the site and surrounding properties.

GEOTECHNICAL OVERVIEW

The subsurface conditions encountered in the borings generally consists of very loose to very dense or soft to medium stiff mixtures of silt, sand, and clay with varying amounts of gravel. The borings were generally completed within the native soils and the maximum exploration depth was about 37 feet below the existing ground surface. Based on the subsurface conditions disclosed by our investigation, we offer the following recommendations:

- Foundations for the proposed press box building may be supported on stable native soils, or on imported Structural Fill which is placed over stable native soils. Existing fills (if encountered) should not be relied upon for new foundation support, and if encountered should be removed from beneath foundations. Foundation recommendations are presented in the **Shallow Foundations** section. The **Floor Slabs** section addresses slab-on-grade support of the building.

- Consideration may be given to support pavements over the existing fills (including aggregate base course), provided the subgrade surfaces are proof-rolled and stabilized as may be required. It should be understood the proof-rolling will lessen, but not eliminate, the possibility that settlement of pavements constructed over the existing fills may occur over time and require periodic maintenance. The **Pavement** section addresses recommendation for support of the slabs-on-grade and pavement.

- Consideration may be given to the reuse of excavated site soils for general grade increases, once cleansed of any oversize particles, unsuitable debris or organics, and subject to the approval of the Geotechnical Engineer based upon the conditions encountered at the time of construction. If construction is performed during the wet season, it is possible the moisture content of the excavated soils is more than the optimum moisture content required to achieve proper compaction, and that proper compaction of the on-site soils may be very difficult to achieve. Saturated soils which cannot achieve compaction should be removed or used in non-structural areas where significant post construction settlement is acceptable. The contractor is ultimately responsible for moisture conditioning of fill/backfill materials to achieve proper compaction. Project plans and budgeting should include an imported granular material for this purpose.

- Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Standard sump and pump methods are likely going to be sufficient for its removal. If construction is performed during the wet season, it is possible that larger and deeper sumps and pumps may be required. Dewatering is a means and methods consideration for the contractor.

The following sections of this report provide more detailed recommendations to assist in planning for the geotechnical aspects of the project. We should be provided with the opportunity to review plans and specifications prior to their release for bidding to confirm that our recommendations were properly understood and implemented, and to allow us to refine our recommendations, if warranted, based upon the final design.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, stabilization of subgrade surfaces as necessary, foundation excavation and associated site fill and backfill. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Construction site safety is the sole responsibility of the contractor, who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities. Such responsibility is neither implied nor shall it be inferred.

Site Preparation

Site preparation should begin with stripping of surficial organic matter and removal of unsuitable soil as applicable from the building and pavement areas. If encountered, any existing (or old) building foundations, slabs or below grade structures should be removed in their entirety from beneath the proposed building area. We recommend actual stripping depths be evaluated by the Geotechnical Engineer during construction.

Prior to placing fills to raise site grades (if necessary) and/or after cuts are made to the plan subgrade elevations (if required), the subgrades should be proof-rolled using a steel drum roller with a static weight of at least 10 tons. The roller should operate in its static (non-vibratory) mode, unless requested otherwise by the Geotechnical Engineer observing the work, and travel at a speed not exceeding three feet per second (two miles per hour). The roller should complete at

least two passes over all subgrade surfaces. The method of proof-rolling may be modified by the Geotechnical Engineer based upon the conditions disclosed at the time of construction.

Soft areas identified by the proof-rolling should be investigated to determine the cause and stabilized accordingly. These investigations may include the excavation of test pits. If observed soils are found and determined by to be unsuitable by the Geotechnical Engineer, they should be removed and replaced as deemed necessary.

Although the subgrade materials may be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. Should unstable subgrade conditions develop, stabilization measures will need to be employed.

Construction traffic over completed subgrades should be avoided to the extent practical. The subgrade surface should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed, or these materials should be scarified, moisture conditioned, and recompacted prior to placement of additional fill lifts, and on-grade mats.

Fill Material Types

Structural Fill should be used as fill/backfill within the proposed building and pavement areas. The fill should consist of imported sand and crushed gravel or crushed stone which meets the limits of gradation given below. Any imported materials should be free of recycled concrete, asphalt, bricks, glass, and pyritic shale rock.

IMPORTED STRUCTURAL FILL

Sieve Size	Percent Finer
3”	100
¼”	30 to 75
No. 40	5 to 40
No. 200	0 to 10

Excavated native soils may be considered for reuse as Structural Fill for general grade increases, if approved by the Geotechnical Engineer and pending the conditions encountered at the time of construction. Any reuse of the existing fill would require that all organics, oversize particles and unsuitable foreign matter found therein be separated and wasted off-site. We do not recommend using on-site soils as replacement for Aggregate Base or Subbase Course beneath concrete slabs and pavement.

We recommend that at the time of construction the Geotechnical Engineer be consulted for approval of the excavated soils as fill material. We anticipate that additional testing consisting of grain-size distributions, Atterberg limits, organic content, and Proctor testing obtained from bulk samples representative of the on-site excavated material may be required to confirm the suitability of excavated material as Structural Fill.

If construction is performed during the wet season, it is possible the moisture content of the excavated soils is more than the optimum moisture content required to achieve proper compaction, and that proper compaction of the on-site soils may be very difficult to achieve. Saturated soils which cannot achieve compaction should be removed or used in non-structural areas where significant post construction settlement is acceptable. The contractor is ultimately responsible for moisture conditioning of fill/backfill materials to achieve proper compaction.

Fill Compaction Requirements

New fills beneath the press box and pavements should be placed in uniform loose layers no more than about one-foot thick where heavy vibratory compaction equipment is used. Smaller lifts should be used where hand operated equipment is required for compaction. Each lift should be compacted to no less than 95 percent of its maximum dry density as determined by the Modified Proctor Compaction Test, ASTM D1557. In landscape areas, the compaction requirement may be relaxed to 90 percent of maximum dry density. Onsite soil used for subgrade fill should have a moisture content within +/-2 percent of its optimum moisture content when it is placed and compacted.

Utility Trench Backfill

Trench excavations should be wide enough to permit construction including backfill placement and compaction. Trenches should be backfilled with material that approximately matches the permeability characteristics of the surrounding soil to reduce the infiltration and preferential conveyance of surface water through the trench backfill. Fill placed as backfill for utilities located below the slab should consist of compacted Structural Fill or suitable bedding material.

Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The trench backfill should incorporate an effective trench plug that extends at least 5 feet out from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for Structural Fill stated previously in this report.

Grading and Drainage

Grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation settlements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts discharging onto splash blocks at a distance of at least 10 feet from the buildings.

Exposed ground should be sloped and maintained at a minimum 5 percent away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After buildings construction and landscaping, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary as part of the structure's maintenance program. Where paving or flatwork abuts the structure a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations, for the proposed structures should be feasible with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of foundations and floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. It should be anticipated the groundwater table could rise and affect earthwork and foundation operations. The contractor should select a dewatering method to lower groundwater as necessary to minimize bearing surface disturbance during construction of footings and utilities. Dewatering is a means and methods consideration for the contractor.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations. The contractor should be aware that slope height, slope inclination, and excavation depth should in no instance exceed OSHA guidelines. OSHA guidelines are strictly enforced and if they are not followed, the owner, contractor, and/or earthwork and utility subcontractor could be liable and subject to substantial penalties.

The contractor must evaluate soil conditions during excavations since variations in the soil can occur across the site. We recommend that the excavations be monitored continuously for signs of deterioration such as seepage of water or sloughing of soil into the excavation. Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information and recommendations provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of unsuitable fill, proofrolling and mitigation of areas delineated by the proof-roll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer’s evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for design of foundations supporting the press box building located at the Homer High School. Our recommendations are based upon the subsurface conditions encountered in the test boring HHS-SB1.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure [1, 2]	2,500 psf
Required Bearing Stratum [3]	Stable native soils or compacted Structural Fill placed upon stable native soil.
Minimum Foundation Dimensions	Columns: 30 inches Continuous: 18 inches
Ultimate Passive Resistance [4] **(equivalent fluid pressures)**	390 pcf (compacted Structural Fill)
Ultimate Coefficient of Sliding Friction [5]	0.35 (Footing on stable native soil) 0.45 (Footing on compacted Structural Fill)
Minimum Embedment below Finished Grade [6]	Exterior footings in unheated areas: 48 inches Exterior footings in heated areas: 48 inches Interior footings in heated areas: 18 inches
Estimated Total Settlement from Structural Loads [2]	Less than about 1 inch
Estimated Differential Settlement [2, 7]	About 2/3 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. These bearing pressures can be increased by 1/3 for transient loads unless those loads have been factored to account for transient conditions. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**. The settlements should occur relatively quickly as construction is completed and each load increment is applied.
3. The bearing grades should be prepared per the recommendations presented below in the **Foundation Construction Considerations**.
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted Structural Fill be placed against the vertical footing face. The Structural Fill must extend out and up from the base of the foundation at an angle of at least 60 degrees from vertical for the passive case.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions.
6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7. Differential settlements are as measured over a span of 50 feet.

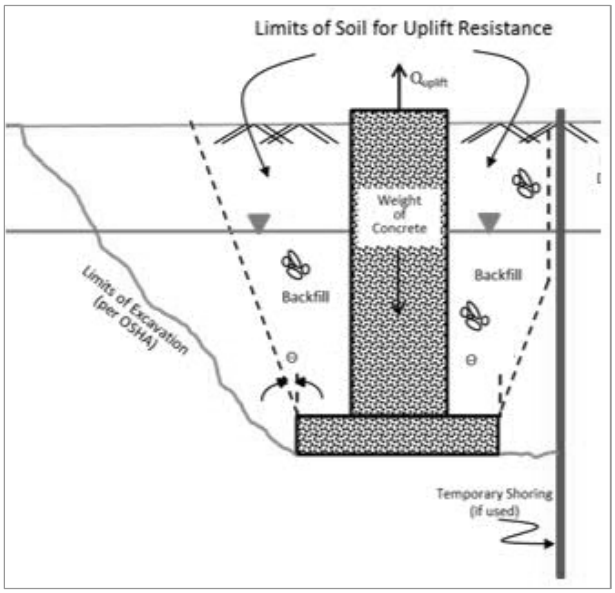
Construction Adjacent to Existing Building

Differential settlement between the additions and the existing building is expected to approach the magnitude of the total settlement of the addition. Expansion joints should be provided between the existing building and the proposed addition to accommodate differential movements between the two structures. Underground piping between the two structures should be designed with flexible couplings and utility knockouts in foundation walls should be oversized, so minor deflections in alignment do not result in breakage or distress. Care should be taken during excavation adjacent to existing foundations, to avoid disturbing existing foundation bearing soils.

New footings should bear at or near the bearing elevation of immediately adjacent existing foundations. Depending upon their locations and current loads on the existing footings, footings for the new addition could cause settlement of adjacent walls. To reduce this concern and risk, clear distances at least equal to the new footing widths should be maintained between the addition's footings and footings supporting the existing building.

Design Parameters - Uplift Loads

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle, θ, of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A maximum total unit weight of 110 pcf should be used for the backfill. This unit weight should be reduced to 50 pcf for portions of the backfill or natural soils below the groundwater elevation.



Foundation Construction Considerations

The foundations may be constructed directly on stable native soils or on imported Structural Fill placed over native soils after removal of all existing fill, along with any remains of former structures or otherwise unsuitable materials that may be found. Any large cobbles and/or boulders encountered beneath the proposed foundations at the bearing grade elevation should be removed

from the bearing surface, as necessary to prevent hard points, and then backfilled with properly compacted Structural Fill. If over-excavation is required beneath the foundations to remove unsuitable material, the excavation should extend horizontally beyond each side of the foundation a distance equal to at least one-half the depth of the undercut below the final bearing grade elevation. Replacement material should meet the specification and compaction guidelines for structural fill as outlined herein.

Excavation to foundation bearing grades should be performed with a smooth blade bucket. If groundwater seepage occurs, a minimum six-inch thick base of clean crushed stone (ASTM C33 Blend 57 aggregate) placed over a geotextile fabric should be provided to establish a more uniform and stable base for construction and to assist in dewatering.

All final bearing grades should be relatively firm, stable, and free of loose soil, mud, water and frost. The Geotechnical Engineer should approve the condition of the foundation bearing grades immediately prior to placement of reinforcing steel and concrete.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is E**. Subsurface explorations at this site were extended to a maximum depth of 37 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Special attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support [1]	Minimum 9 inches of Aggregate Base material compacted to at least 95% of Modified Proctor (ASTM D 1557) placed directly upon proofrolled stable on-site subgrade soils.
Estimated Modulus of Subgrade Reaction [2]	150 pounds per square inch per inch (psi/in) for point loads for concrete placed upon the Aggregate Base

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

Finished subgrade within and for at least 10 feet beyond the floor slab should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and Structural Fill should be added to replace the

resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs, noted in this section, must be applied to the site, which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

Pavement designs were based on *AASHTO Guide for Design of Pavement Structures (1993)* and our experience with similar projects. The thickness of each course is a function of subgrade strength, traffic, design life, serviceability factors, and frost susceptibility.

A subgrade CBR of 3 was used for the AC pavement designs, and a modulus of subgrade reaction of 100 pci was use for the PCC pavement designs. The values were empirically derived based upon our experience with the on-site soils and our understanding of the quality of the subgrade as prescribed by the **Site Preparation** conditions as outlined in **Earthwork**.

Pavement Section Thicknesses

Frost susceptibility is a major factor in the overall pavement section thickness. The total pavement structural sections presented in this report are based also upon the expected depth of freeze.

Because of the fine-grained nature of the in-situ soil at some locations, and possible variations across the site of subgrade material (i.e., existing fill, native soils, and compacted Structural Fill), we recommend a separation high-strength woven geotextile (such as HP270 or approved equivalent), be placed upon all new approved flexible pavement subgrades prior to placing the subbase course materials. All underground utilities should be installed prior to geotextile placement. The geotextile will provide separation (i.e., mitigate migration of fines into the overlying subbase course material, which may contribute to its degradation and loss of strength), filtration (i.e., allow for movement of water across the plane of the geotextile with limited soil loss), confinement (i.e., restrain lateral movement of the aggregate), and reinforcement.

The following tables provide options for Asphaltic Concrete and for Portland Cement Sections

Asphaltic Concrete Design		
Layer	**Thickness (inches)**	
	Light Duty [1]	**Heavy Duty/Bus Loop** [1]
Asphalt Top Course [2]	1.5	1.5
Asphalt Binder Course [2]	2.5	2.5
Asphalt Base Course [2,3]	none	6.0
Aggregate Base Course [2]	12.0	9.0

1. See **Project Description** for more specifics regarding pavement type.
2. All materials should meet the current NYSDOT Department of Transportation (NYSDOT) Standard Specifications.
   - Asphalt Top Course – NYSDOT Standard Specification Section 402 for Type 9.5 mm
   - Asphalt Binder Course – NYSDOT Standard Specifications for Type 19 mm Binder Course
   - Asphalt Base Course – NYSDOT Standard Specifications for Type 37.5 mm Binder Course
   - Aggregate Base Course – NYSDOT Standard Specifications for Type 2 Subbase Course, Item No. 304.12
3. Asphalt Base Course to be placed in two, 3-inch-thick lifts.

Portland Cement Concrete Design		
Layer	**Thickness (inches)**	
	Light Duty [2,3]	**Heavy Duty** [2,3,4]
PCC [1]	6	8
Aggregate Base [1]	9	12

1. All materials should meet the current State, County, and City Department of Transportation (NYSDOT) Standard Specifications for Highway and Bridge Construction.
   - The concrete should be air entrained and have a minimum compressive strength of 4,000 psi after 28 days of laboratory curing per ASTM C-31. Refer to NYSDOT Section 501 – Portland Cement Concrete for material specifications.
   - Aggregate Base Course, NYSDOT Section 304 for Type 2 Subbase Course, Item No. 304.12
2. Proper joint spacing will be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer.
3. Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its "green" state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.
4. In areas of anticipated heavy traffic, fire trucks, delivery trucks, or concentrated loads (e.g. dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles.

The estimated pavement sections provided in this report are minimums for the assumed design criteria, and as such, periodic maintenance should be expected. Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles. A maintenance program that includes surface sealing, joint cleaning and sealing, and timely repair of cracks and deteriorated areas will increase the pavement's service life. As an option, thicker sections could be constructed to decrease future maintenance.

Pavement Drainage

Accumulation of water on pavement subgrades should be avoided by grading the subgrade to a slope of at least two percent, and/or by providing underdrains. Swales should be provided at the pavement edges for drainage relief. Failure to provide adequate drainage will shorten pavement life.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. This is especially applicable for islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils. The civil design for the pavements with these conditions should include features to restrict or to collect and discharge excess water from the islands. Examples of features are edge drains connected to the storm water collection system, longitudinal subdrains, or other suitable outlet and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Pavement Maintenance

All pavements require periodic care, and preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Settlement of pavements due to consolidation of the existing fills may also occur and require periodic maintenance.

FROST CONSIDERATIONS

Frost may penetrate beneath sidewalks and pavements and cause them to heave, and resulting displacements may be differential, particularly where sidewalks and pavements meet building doorways and along curbs. To limit heave and the creation of such uneven joints to generally tolerable magnitudes for most winters, a 16-inch thick base of ASTM C33 Blend 57 crushed stone

should be placed beneath sensitive sidewalk or pavement areas, along with an underdrain to relieve any collected waters.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

FIGURES

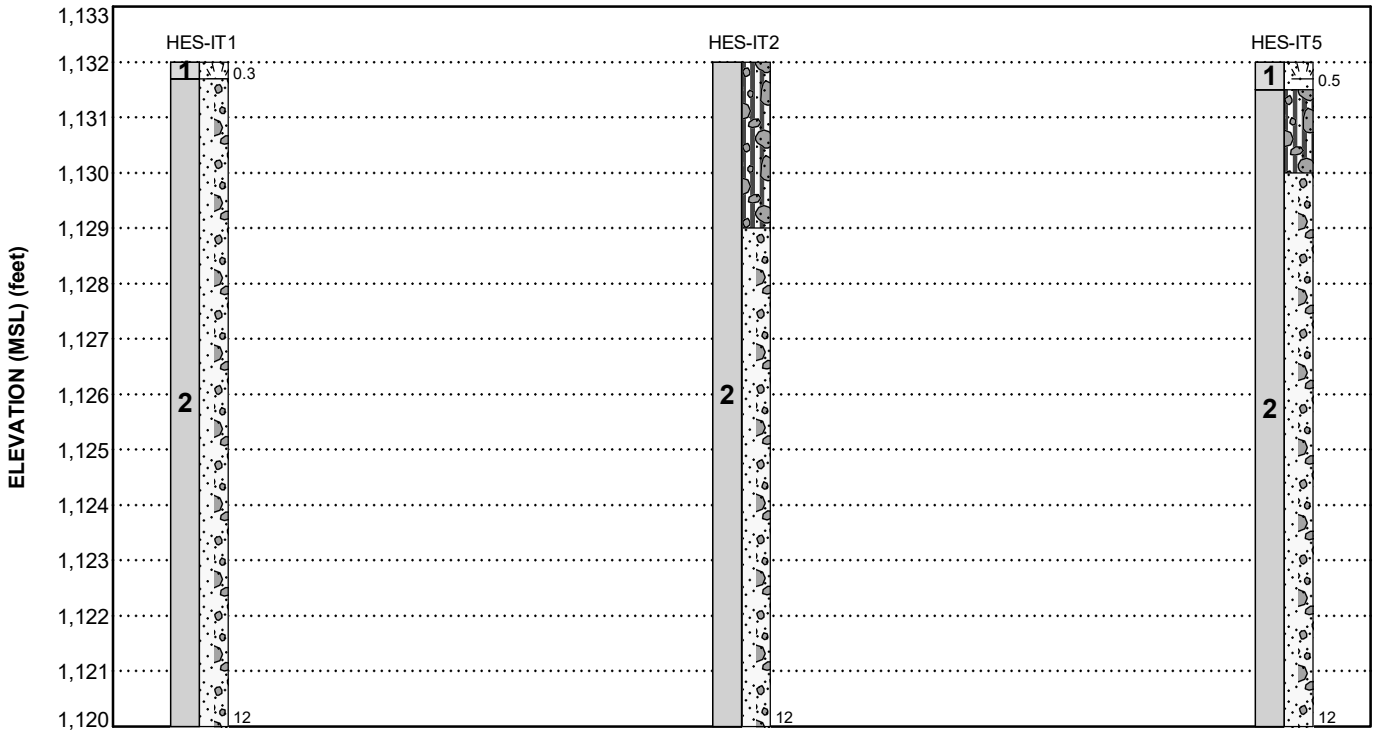
Contents:

GEOMODEL

Homer CSD 2021 CIP ■ Cortland County, NY
Terracon Project No. J5225186

Terracon GeoReport

Elementary School



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Surface	Topsoil or Asphalt with Aggregate Base Course
2	Native Soil	Mixtures of predominantly Silt, Sand and Gravel with Clay (SP; ML; CL-ML; SP-SC); very loose to very dense or soft to medium stiff

LEGEND

Topsoil

Poorly-graded Sand with Gravel

Gravelly Silt with Sand

▽ First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

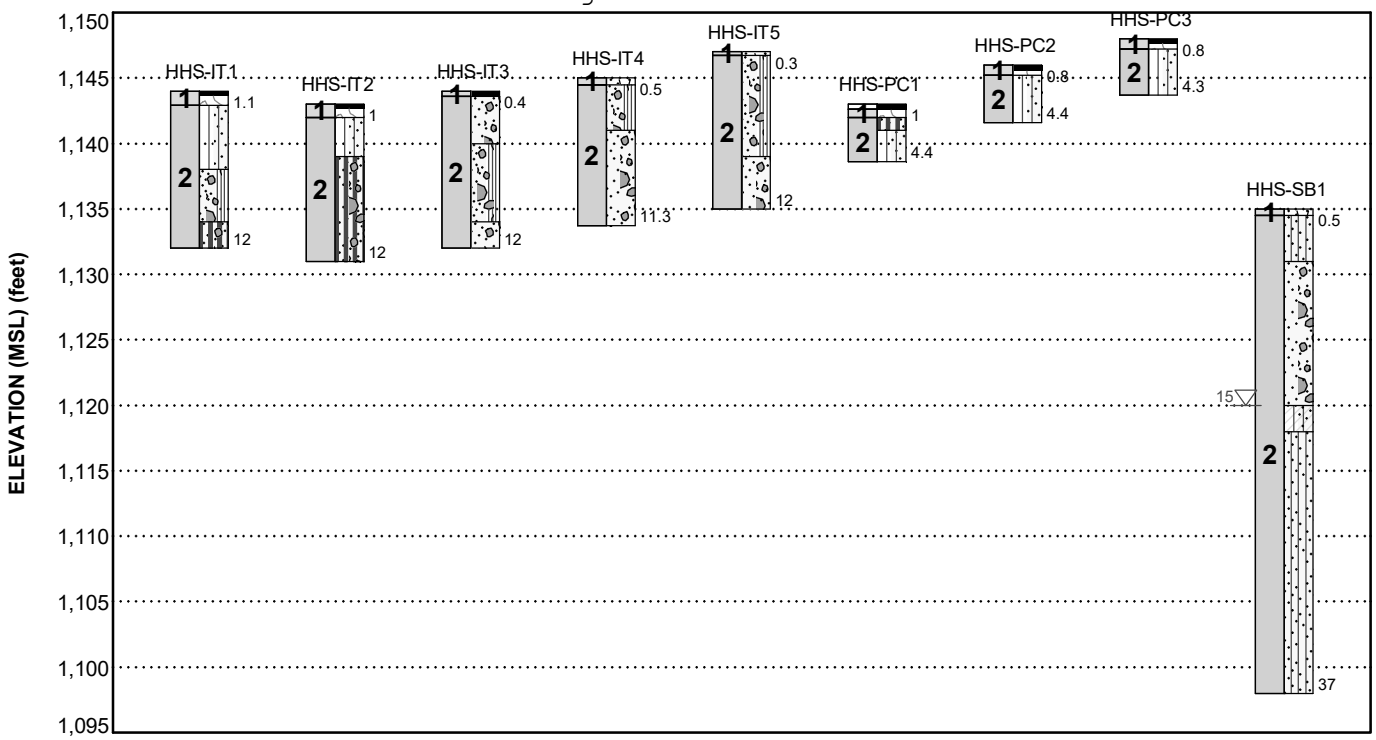
NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Homer CSD 2021 CIP ■ Cortland County, NY
Terracon Project No. J5225186

Terracon GeoReport

High School



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	**Surface**	Topsoil or Asphalt with Aggregate Base Course
2	**Native Soil**	Mixtures of predominantly Silt, Sand and Gravel with Clay (SP; ML; CL-ML; SP-SC); very loose to very dense or soft to medium stiff

LEGEND

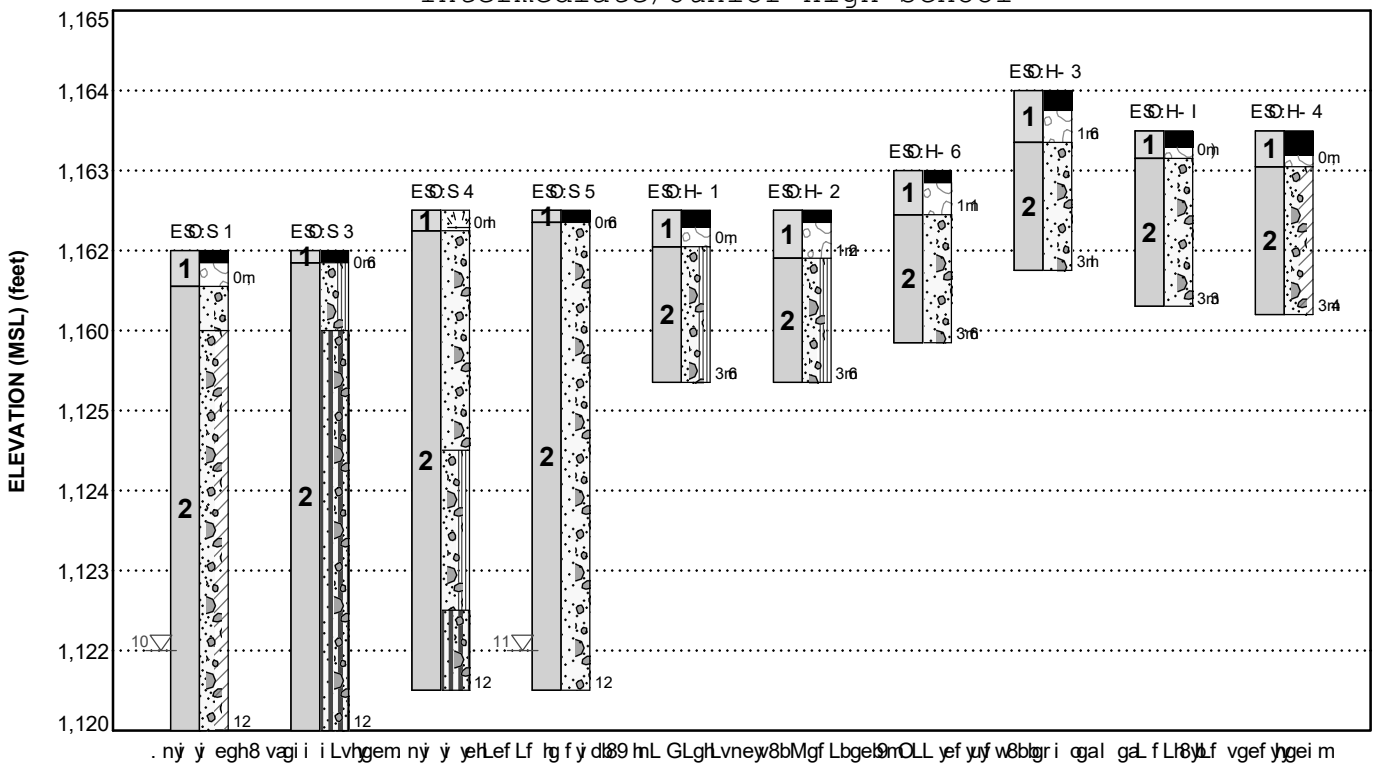
- Asphalt
- Aggregate Base Course
- Silt with Sand
- Poorly-graded Sand with Silt and Gravel
- Sandy Silt with Gravel
- Poorly-graded Sand with Gravel
- Topsoil
- Sandy Silt
- Silty Sand
- Silty Clay with Sand

▽ First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

Intermediate/Junior High School



. nyi yi egh8 vagi i Lvhggem nyi yi yehLef Lf hg f yi dl89 hmL GLghLvneyw8bMgf Lbgel9mOLL yef yuyf w8blggri ogal gaL f Lf8ybLf vgef yhggei m

Model Layer	Layer Name	General Description
1	Surface	. gdi gybgaPi dn8thsym PrraLr8hL A8i L - gwai L
2	Native Soil	MyxhwaLi godaLfgl ye8eh9 Oybn O8ef 8ef Ga8uLbsym - l89 BOHOM7C- 7:M7COH:O- (OuLa9 lggi L hguLa9 f LeiL gai gdhhg l Lf yw i hyoo

LEGEND

- Pi dn8th
- PrraLr8hL A8i L - gwai L
- Hggal9:ra8f Lf O8ef syhm Ga8uLb
- Hggal9:ra8f Lf O8ef syhm - l89 8ef Ga8uLb
- Hggal9:ra8f Lf O8ef syhm Oybn8ef Ga8uLb
- O8ef 9 Oybnsym Ga8uLb
- . gdi gyb

▽ FyaihW8hLaj ti Lau8hgge

Gagwefs 8hLabLuLbi 8aL hLl dga8bm nLlbLuLbi ingse 8aL aLdaLi Leh8hyuL gohmL f 8hL 8ef hy L gogwaLxdlga8hggemOyreygv8ehvn8erLi 8aL dgi iybL guLahy Lm W8hLabLuLbi ingse 8aL 8i l L8iwaLf fwayer 8ef/ga8dLafaybyer m8e igl Lv8iLi, tgayer 8fu8evLl Lehl Lhngfi l 8ikhmL daLi LevL/8ti LevL gor agwefs 8hLamOLL yef yuyf w8blggri ogaf Lf8ybim

qj . NOT
789Layer ings e ge hmyi oy rwaL n8i t LLe f LuLbgdLf t 9hmL r LgHLvneyw8bLeryeLLaogadwadgi Li gol gf Lbyer hmLi wt iwaa8vL vgef yhggei 8i aLpwyaLf ogahmLi wt i LpwLehr LgHLvneyw8bLeryeLLayer ogahmyi dagdLvhm
qwl t Lai 8fc8vLehhg i gybvgbwl e yef yw8hL f LdHm t Lbgs r agwef iwaa8vLm

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet) [1]	Planned Location
3 test borings (HES-IT1, HES-IT2, and EIT-5)	12	Homer Elementary School
5 Infiltration Tests (Near HES-IT1, HES-IT2, and EIT-5)	10	
5 test borings (HHS-IT1 through HHS-IT5)	11 to 12	Homer High School
1 test boring (HHS-SB1)	37	
5 Infiltration Tests (near HHS-IT1 through HHS-IT5)	10	
3 Asphalt Pavement Cores (HHS-PC1 through HHS-PC3)	4.3 to 4.4	
4 test borings (HIS-IT1, HIS-IT4, HIS-IT6, and HIS-IT8)	12	Homer Intermediate/Junior High School
8 Infiltration Tests (Near HIS-IT1 through HIS-IT8)	9.5 to 10	
6 Asphalt Pavement Cores (HIS-PC1 through HHS-PC6)	4.3 to 4.6	

1. Below ground surface

Boring Layout and Elevations: Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from a site topographic plan provided by HUNT. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using continuous hollow stem flight augers. A portable core machine with a 4-inch diameter core barrel was used to obtain cores of the existing pavement at 9 locations.

Soil samples were obtained using split-spoon samples. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the middle 12 inches of a normal 24-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion. Borings at the parking lots were patched with pre-mixed concrete.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field

boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Infiltration Testing

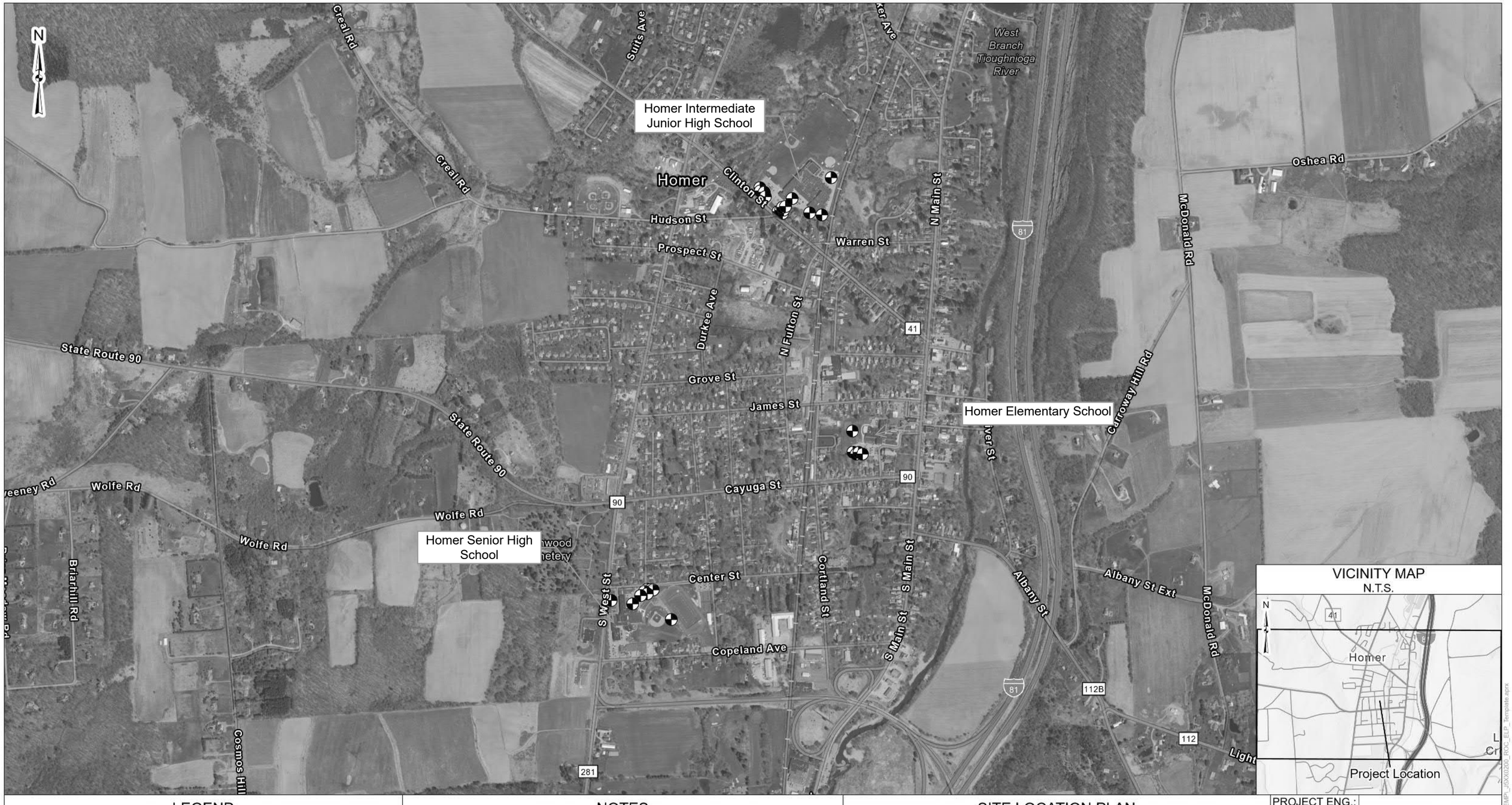
A total of eighteen PVC pipes were installed for infiltration testing at the three schools (5 at the Homer Elementary School, 5 at the Homer High School, and 8 at the Homer Intermediate/Junior High School). The pipes were installed in proximity to the companion borings to depths ranging from about 9.5 to 10 feet bgs. The infiltration tests were performed in accordance with NYDEC Stormwater Management Design Manual - **Appendix D:** Infiltration Testing Requirements. The infiltration testing was performed as follow:

- Upon reaching the planned depth, a solid PVC pipe was firmly seated into the bottom of the borehole.
- The pipe was filled with water to a depth of 24 inches above the bottom of the borehole and allowed to pre-soak for 24 hours to simulate saturated conditions.
- After 24 hours, water was added to the casing, as necessary, to bring the water level to a depth of 24 inches above the bottom of the borehole and the drop in the water level was monitored and measured after 1 hour.
- The monitoring process was repeated a total of four times.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Note: All attachments are one page unless noted above.



VICINITY MAP
N.T.S.

LEGEND

- Test Boring Location and Designation

NOTES

1. Base map developed using aerial imagery from ESRI.
2. Vicinity map generated using imagery from © Open Street Map contributors and Esri.
3. Exploratory locations were marked in the field by Terracon Consultants - NY, Inc.
4. Diagram is for general location only and not intended for construction purposes.
5. Exploratory locations are approximate.

SITE LOCATION PLAN

PROJECT:	Homer CSD 2021 CIP
LOCATION:	Cortland County, New York
CLIENT:	Hunt Engineers, Architects, & Land Surveyors
TCI PROJECT NO.:	J5225186
SCALE:	1" : 1,000'

PROJECT ENG.:	ZBK
APPROVED BY:	MAF
DRAWN BY:	JJK
DATE:	09/12/2022

Terracon

DIAGRAM NO.:
J5225186.B1

C:\GIS\Projects\J5225186_Homer\CSD\ROC_ELP_TEMP_v5\X0020_ROC_ELP_Template.aprx

LEGEND	NOTES	EXPLORATORY LOCATION PLAN	
◔ Test Boring Location and Designation	1. Base map developed using aerial imagery from ESRI. 2. Vicinity map generated using imagery from © Open Street Map contributors and Esri. 3. Exploratory locations were marked in the field by Terracon Consultants - NY, Inc. 4. Diagram is for general location only and not intended for construction purposes. 5. Exploratory locations are approximate.	PROJECT: Homer CSD 2021 CIP LOCATION: Cortland County, New York CLIENT: Hunt Engineers, Architects, & Land Surveyors TCI PROJECT NO.: J5225186 SCALE: 1" : 60'	PROJECT ENG.: ZBK APPROVED BY: MAF DRAWN BY: JJK DATE: 09/12/2022 DIAGRAM NO.: J5225186.B2

Terracon

C:\GIS\Projects\J5225186_Homer\GIS\ROC_ELP_TEMP_J5XX0260_ROC_ELP_Template.aprx

LEGEND

- Test Boring Location and Designation

NOTES

1. Base map developed using aerial imagery from ESRI.
2. Vicinity map generated using imagery from © Open Street Map contributors and Esri.
3. Exploratory locations were marked in the field by Terracon Consultants - NY, Inc.
4. Diagram is for general location only and not intended for construction purposes.
5. Exploratory locations are approximate.

EXPLORATORY LOCATION PLAN

PROJECT:	Homer CSD 2021 CIP
LOCATION:	Cortland County, New York
CLIENT:	Hunt Engineers, Architects, & Land Surveyors
TCI PROJECT NO.:	J5225186
SCALE:	1" : 60'

PROJECT ENG.:	ZBK
APPROVED BY:	MAF
DRAWN BY:	JJK
DATE:	09/12/2022
DIAGRAM NO.:	J5225186.B3

Terracon

C:\GIS\Projects\J5225186_Homer\CSD\ROC_ELP_TEMP_J5X0200_ROC_ELP_Template.aprx

LEGEND	NOTES	EXPLORATORY LOCATION PLAN	
◒ Test Boring Location and Designation	1. Base map developed using aerial imagery from ESRI. 2. Vicinity map generated using imagery from © Open Street Map contributors and Esri. 3. Exploratory locations were marked in the field by Terracon Consultants - NY, Inc. 4. Diagram is for general location only and not intended for construction purposes. 5. Exploratory locations are approximate.	PROJECT: Homer CSD 2021 CIP LOCATION: Cortland County, New York CLIENT: Hunt Engineers, Architects, & Land Surveyors TCI PROJECT NO.: J5225186 SCALE: 1" : 60'	PROJECT ENG.: ZBK APPROVED BY: MAF DRAWN BY: JJK DATE: 09/12/2022 DIAGRAM NO.: J5225186.B4

Terracon

C:\GIS\Projects\J5225186_Homer\CSD\ROC_ELP_TEMP_J5XX0260_ROC_ELP_Template.aprx

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

BORING LOG NO. HES-IT1

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Elementary School
Latitude: 42.6361° Longitude: -76.1814°

Approximate Surface Elev.: 1132 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.3	**TOPSOIL**	1131.7+/-				
2			**POORLY GRADED SAND WITH GRAVEL (SP)**, trace clay, brown, medium dense		5			5-6-8-11 N=14
								10-11-9-9 N=20
								9-13-17-18 N=30
								11-10-9-5 N=19
					10			6-7-6-9 N=13
								7-11-13-13 N=24
		12.0		1120+/-				
			Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022 | Boring Completed: 08-10-2022
Drill Rig: DR632 | Driller: S. Kahn
Project No.: J5225186

BORING LOG NO. HES-IT2

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Elementary School
Latitude: 42.6354° Longitude: -76.1814°

Approximate Surface Elev.: 1132 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		0.0					
		GRAVELLY SILT WITH SAND (ML), trace clay, brown, stiff					2-5-7-8 N=12
		3.0	1129+/-				5-3-3-2 N=6
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, trace clay, brown, loose to medium dense		5			4-6-8-13 N=14
							13-11-12-14 N=23
				10			10-7-7-7 N=14
							6-7-10-14 N=17
		12.0	1120+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HES-IT5

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Elementary School
Latitude: 42.6354° Longitude: -76.1810°

Approximate Surface Elev.: 1132 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.5	1131.5+/-				
		TOPSOIL					
		2.0	1130+/-				2-3-6-11 N=9
		GRAVELLY SILT WITH SAND (ML), trace clay, grayish brown, stiff					
2		**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, trace clay, brown, medium dense to dense					7-11-10-9 N=21
				5			11-20-18-20 N=38
							20-21-22-24 N=43
							24-19-15-31 N=34
				10			19-17-18-21 N=35
		12.0	1120+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-IT1

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6313° Longitude: -76.1899°

Approximate Surface Elev.: 1144 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.3 **ASPHALT**	1143.7+/-				
		AGGREGATE BASE COURSE					
		1.1	1142.9+/-				11-7-5 N=12
2		**SILT WITH SAND (ML)**, trace clay, brown, medium stiff to stiff					5-3-4-6 N=7
				5			4-4-3-3 N=7
		6.0	1138+/-				
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), trace clay, brown, medium dense					3-4-6-7 N=10
		Becomes loose					4-2-3-8 N=5
		10.0	1134+/-	10			
		SANDY SILT WITH GRAVEL (ML), trace clay, brown, stiff					5-6-8-10 N=14
		12.0	1132+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-12-2022	Boring Completed: 08-12-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-IT2

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6313° Longitude: -76.1897°

Approximate Surface Elev.: 1143 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1	0.3	1142.7+/-	**ASPHALT**				
	1.0	1142+/-	**AGGREGATE BASE COURSE**, sand and gravel				11-9-8 N=17
2			**SILT WITH SAND (ML)**, trace gravel, brown, very stiff Becomes medium stiff				5-3-3-5 N=6
	4.0	1139+/-					
			SANDY SILT WITH GRAVEL (ML), brown, medium stiff	5			5-4-4-5 N=8
							4-3-2-1 N=5
			Becomes very soft to soft				WOH-1-1-1 N=2
				10			WOH-WOH-WOH-WOH N=WOH
	12.0	1131+/-					
			Boring Terminated at 12 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:
WOH= Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-12-2022	Boring Completed: 08-12-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-IT3

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6312° Longitude: -76.1899°

Approximate Surface Elev.: 1144 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.4	1143.6+/-				
		ASPHALT					
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, trace clay, brown, medium dense to loose, possible fill					20-12-15 N=27
							6-5-4-6 N=9
		4.0	1140+/-				
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), trace clay, brown, loose		5			3-3-4-3 N=7
							2-3-1-2 N=4
							2-2-7-8 N=9
		10.0	1134+/-	10			
		POORLY GRADED SAND WITH GRAVEL (SP), trace clay, brown, medium dense					7-8-10-8 N=18
		12.0	1132+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

WATER LEVEL OBSERVATIONS

Groundwater not encountered

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-12-2022	Boring Completed: 08-12-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-IT4

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6313° Longitude: -76.1900°

Approximate Surface Elev.: 1145 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1	0.5	1144.5+/-				
		TOPSOIL				
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), brown, medium dense				2-6-11-11 N=17
						14-9-13-7 N=22
	4.0	1141+/-				
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, brown, medium dense	5			9-9-7-4 N=16
		Becomes loose				1-2-2-4 N=4
		Becomes medium dense				3-7-6-24 N=13
			10			50/4"
	11.3	1133.7+/-				
		Auger Refusal at 11.3 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-11-2022	Boring Completed: 08-11-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-IT5

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6310° Longitude: -76.1913°

Approximate Surface Elev.: 1147 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.3	1146.7+/-	**TOPSOIL**				
2				**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, trace clay, brown, medium dense				3-8-8-9 N=16
								7-5-6-8 N=11
				Becomes loose	5			2-4-3-5 N=7
				Becomes medium dense				5-7-7-10 N=14
		8.0	1139+/-					
				POORLY GRADED SAND WITH GRAVEL (SP), trace clay, brown, medium dense				5-9-12-13 N=21
					10			9-9-9-16 N=18
		12.0	1135+/-					
				Boring Terminated at 12 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-11-2022	Boring Completed: 08-11-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-PC1

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6313° Longitude: -76.1896°

Approximate Surface Elev.: 1143 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		0.4	1142.6+/-				
		ASPHALT					
1		1.0	1142+/-				
		AGGREGATE BASE COURSE					
		2.0	1141+/-				15-11-7-5 N=18
		SANDY SILT (ML), trace clay, trace gravel, brown, very stiff					
2		4.4	1138.6+/-				1-3-2-3 N=5
		SILT WITH SAND (ML), trace clay, trace gravel, brown, medium stiff					
		Boring Terminated at 4.4 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-11-2022	Boring Completed: 08-11-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-PC2

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6311° Longitude: -76.1902°

Approximate Surface Elev.: 1146 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.4	**ASPHALT**	1145.6+/-				
		0.8	**AGGREGATE BASE COURSE**, very stiff, sand and gravel	1145.2+/-				
2			**SILT WITH SAND (ML)**, trace gravel, brown, stiff to very stiff					13-9-6-9 N=15
			Becomes medium stiff					3-4-3-6 N=7
		4.4		1141.6+/-				
			Boring Terminated at 4.4 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-11-2022	Boring Completed: 08-11-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-PC3

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6309° Longitude: -76.1905°

Approximate Surface Elev.: 1148 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		0.3	**ASPHALT**	1147.7+/-				
1		0.8	**AGGREGATE BASE COURSE**, sand and gravel	1147.2+/-				
2			**SILT WITH SAND (ML)**, trace clay, brown, stiff					12-8-6-10 N=14
			Becomes medium stiff					4-3-2-3 N=5
		4.3		1143.7+/-				
			Boring Terminated at 4.3 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-11-2022	Boring Completed: 08-11-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HHS-SB1

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer High School
Latitude: 42.6304° Longitude: -76.1889°

Approximate Surface Elev.: 1135 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1	0.5	1134.5+/-	**TOPSOIL**				
			SILTY SAND (SM), trace clay, trace gravel, brown, medium dense to loose				4-5-7-5 N=12
							5-3-5-7 N=8
	4.0	1131+/-					
			POORLY GRADED SAND WITH GRAVEL (SP), trace clay, brown, medium dense	5			7-8-9-8 N=17
							7-12-9-12 N=21
							9-14-14-11 N=28
				10			7-6-4-4 N=10
	15.0	1120+/-			▽		
			SILTY CLAY WITH SAND (CL-ML), trace gravel, grayish brown, stiff	15			9-7-4-3 N=11
	17.0	1118+/-					
2			**SILTY SAND (SM)**, trace clay, trace gravel, gray, loose				
				20			1-2-2-1 N=4
			Becomes very loose, contains clay seams	25			1-1-1-1 N=2
			Becomes loose	30			4-3-3-4 N=6
				35			1-2-3-1 N=5
	37.0	1098+/-					
			Boring Terminated at 37 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

▽ *15' during drilling*

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-11-2022	Boring Completed: 08-11-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-IT1

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6434° Longitude: -76.1852°

Approximate Surface Elev.: 1132 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		FIELD TEST RESULTS
1	0.3	1131.7+/-	**ASPHALT**	
	0.9	1131.1+/-	**AGGREGATE BASE COURSE**	
2	2.0	1130+/-	**POORLY GRADED SAND WITH GRAVEL (SP)**, grayish brown, dense	151-24-19-13 N=43
			POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), grayish brown, loose	3-2-2-3 N=4
				3-2-3-5 N=5
			Becomes medium dense	10-9-7-6 N=16
				5-6-4-4 N=10
			Becomes loose	4-4-4-6 N=8
	12.0	1120+/-		
			Boring Terminated at 12 Feet	

DEPTH (Ft.): 5, 10

WATER LEVEL OBSERVATIONS: ▽ at 10

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

▽ *10' during drilling*

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-09-2022 | Boring Completed: 08-09-2022
Drill Rig: DR632 | Driller: S. Kahn
Project No.: J5225186

BORING LOG NO. HIS-IT4

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6432° Longitude: -76.1850°

Approximate Surface Elev.: 1132 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.3 **ASPHALT**	1131.7+/-				
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), trace clay, brown, dense					39-16-14-10 N=30
		2.0	1130+/-				
2		**SANDY SILT WITH GRAVEL (ML)**, trace clay, grayish brown, medium stiff to stiff					4-3-4-8 N=7
				5			12-8-5-7 N=13
							6-5-6-9 N=11
		Becomes hard					12-19-14-12 N=33
				10			5-5-5-6 N=10
		12.0	1120+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-09-2022	Boring Completed: 08-02-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-IT6

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6427° Longitude: -76.1843°

Approximate Surface Elev.: 1133 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.5	1132.5+/-				
		TOPSOIL					
		POORLY GRADED SAND WITH GRAVEL (SP), trace clay, brown, medium dense					3-11-18-17 N=29
							19-16-16-17 N=32
				5			17-13-12-9 N=25
		6.0	1127+/-				
2		**POORLY GRADED SAND WITH SILT AND GRAVEL (SP)**, trace clay, brown, medium dense					6-6-7-9 N=13
							8-8-6-7 N=14
		10.0	1123+/-	10			
		SANDY SILT WITH GRAVEL (ML), trace clay, grayish brown, very stiff					8-11-6-18 N=17
		12.0	1121+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-IT8

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6428° Longitude: -76.1843°

Approximate Surface Elev.: 1133 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.3 **ASPHALT**	1132.7+/-				
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, trace clay, brown, dense					50-17-16-17 N=33
		Becomes medium dense					9-10-9-8 N=19
				5			4-6-7-4 N=13
							7-7-6-6 N=13
		Becomes loose					5-3-2-8 N=5
		Becomes dense		10	▽		8-20-17-16 N=37
		12.0	1121+/-				
		Boring Terminated at 12 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

▽ *11' during drilling*

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-09-2022	Boring Completed: 08-09-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-PC1

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6427° Longitude: -76.1844°

Approximate Surface Elev.: 1133 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.4	1132.6+/-				
		ASPHALT					
		0.9	1132.1+/-				
		AGGREGATE BASE COURSE, sand and gravel					
2							25-28-18-9 N=46
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), trace clay, brown, dense to medium dense					3-6-5-5 N=11
		4.3	1128.7+/-				
		Boring Terminated at 4.3 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion of drilling

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-09-2022	Boring Completed: 08-09-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-PC2

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6429° Longitude: -76.1841°

Approximate Surface Elev.: 1133 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		0.3 **ASPHALT**	1132.7+/-				
1		**AGGREGATE BASE COURSE**					
		1.2	1131.8+/-				26-18-16-15 N=34
2		**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, trace clay, dark brown, dense Becomes loose					5-4-5-6 N=9
		4.3	1128.7+/-				
		Boring Terminated at 4.3 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion of drilling

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-09-2022	Boring Completed: 08-09-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-PC3

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6431° Longitude: -76.1839°

Approximate Surface Elev.: 1134 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		0.3 **ASPHALT**	1133.7+/-				
1		**AGGREGATE BASE COURSE**					
		1.1	1132.9+/-				
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, brown, dense to medium dense					17-17-20-25 N=37
							12-12-16-25 N=28
		4.3	1129.7+/-				
		Boring Terminated at 4.3 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion of drilling

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-PC4

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6427° Longitude: -76.1832°

Approximate Surface Elev.: 1136 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
		0.5	1135.5+/-				
1		**ASPHALT**					
		1.3	1134.7+/-				
2		**AGGREGATE BASE COURSE**					
		POORLY GRADED SAND WITH GRAVEL (SP), trace clay, brown, very dense to dense					17-28-55-76 N=83
							11-17-17-27 N=34
		4.5	1131.5+/-				
		Boring Terminated at 4.5 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion of drilling

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-PC5

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6426° Longitude: -76.1827°

Approximate Surface Elev.: 1135 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		0.4	1134.6+/-				
		ASPHALT					
		0.7	1134.3+/-				
		AGGREGATE BASE COURSE, sand and gravel					
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, trace clay, brown, dense					11-18-22-30 N=40
							15-16-14-13 N=30
		4.4	1130.6+/-				
		Boring Terminated at 4.4 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion of drilling

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	

BORING LOG NO. HIS-PC6

PROJECT: Homer CSD 2021 CIP

CLIENT: Hunt Engineers, Architects, & Land Surveyors
Rochester, NY

SITE: Homer
Cortland County, NY

LOCATION See Exploration Plan
Homer Intermidiate J. HS
Latitude: 42.6437° Longitude: -76.1823°

Approximate Surface Elev.: 1135 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
1		**ASPHALT** 0.6	1134.4+/-				
		0.9 **AGGREGATE BASE COURSE**	1134.1+/-				
2		**POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC)**, grayish brown, medium dense					13-11-9-14 N=20
							8-7-15-27 N=22
		4.6	1130.4+/-				
		Boring Terminated at 4.6 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25 inch ID Hollow Stem Augers and 2 inch OD Split Barrel Sampler. A 4 inch a diamond-bit core barrel for pavement coring.

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were interpolated from a topographic site plan provided by HUNT

Notes:

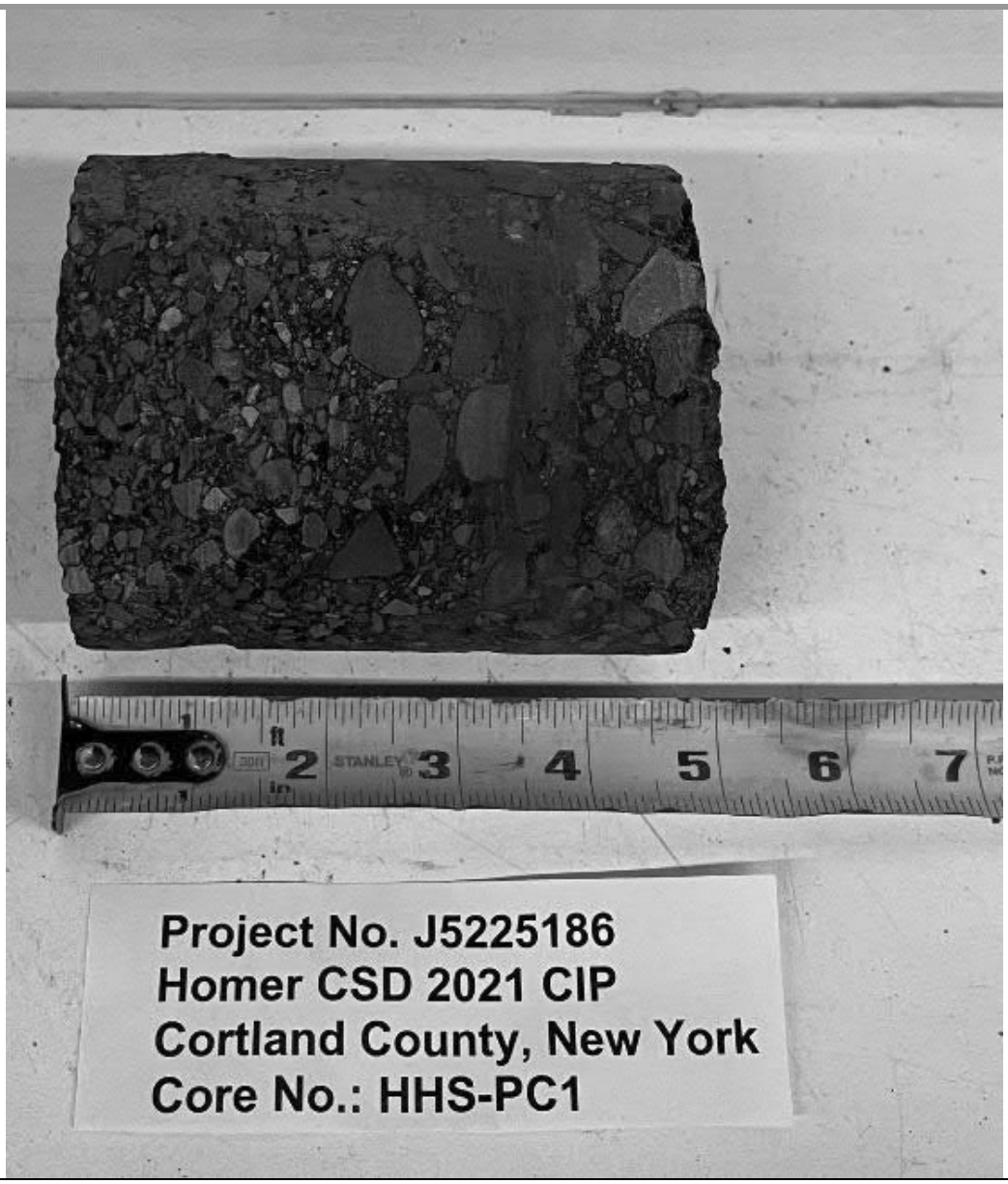
WATER LEVEL OBSERVATIONS

No water observed during drilling

No water observed at completion of drilling

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 08-10-2022	Boring Completed: 08-10-2022
Drill Rig: DR632	Driller: S. Kahn
Project No.: J5225186	



Pavement core at boring HHS-PC1

.

Course	Thickness (inches)	Conditions	Remarks
Top	1.7	Fair	**9.5mm, voided**
Top	2.6	Fair	**12.5mm, voided, partially stripped**
TOTAL	4.3		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Pavement core at boring HHS-PC2

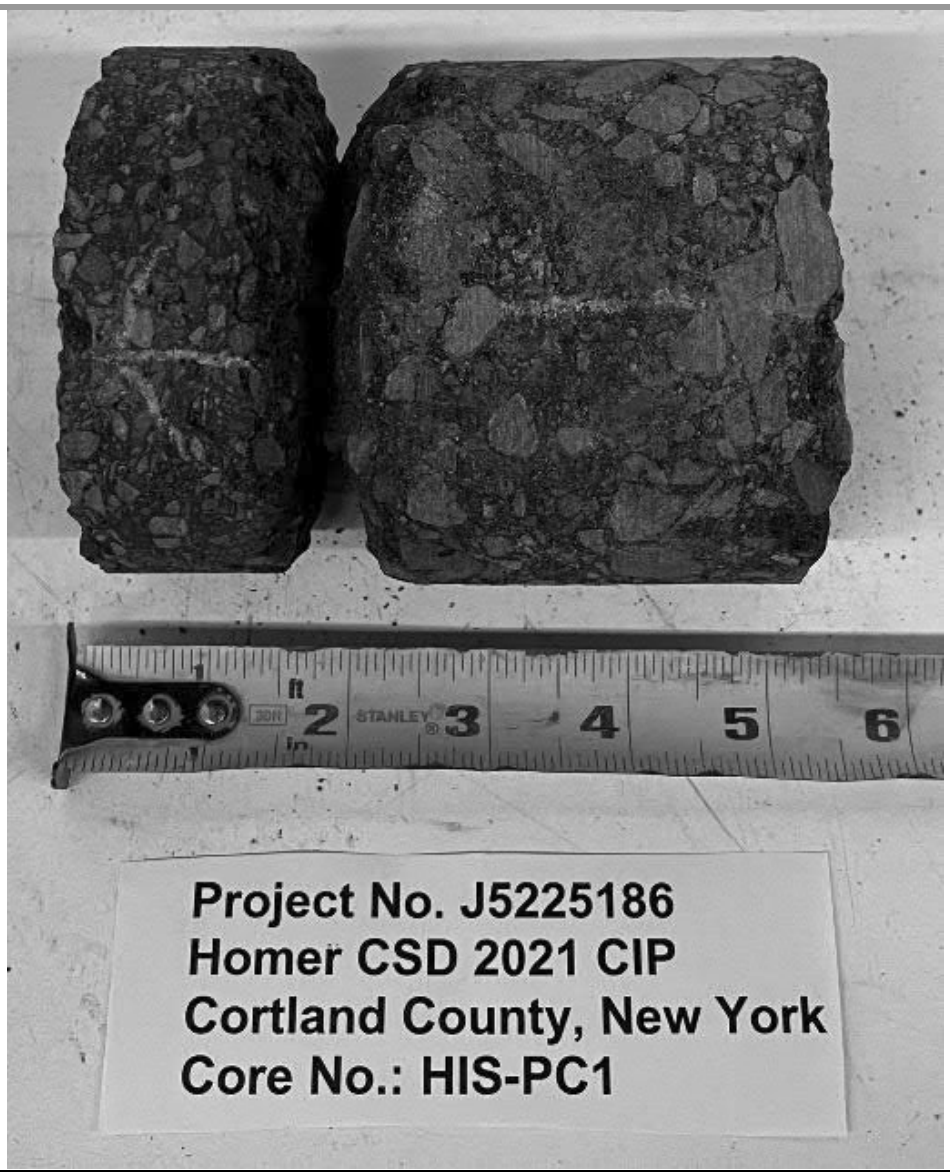
Course	Thickness (inches)	Conditions	Remarks
Chip Seal	0.1	N/A	**N/A**
Top	1.4	Fair	**9.5mm, voided**
Binder	2	Fair	**19.0mm, voided, partially stripped**
TOTAL	3.5		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Pavement core at boring HHS-PC3

Course	Thickness (inches)	Conditions	Remarks
Chip Seal	0.1	N/A	**N/A**
Top	0.9	Fair	**9.5mm, voided**
Top	2.1	Fair	**12.5mm, voided**
TOTAL	3.1		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.



Pavement core at boring HIS-PC1

Course	Thickness (inches)	Conditions	Remarks
Top	1.5	Poor	**9.5mm, voided, partially stripped, delaminated**
Top	3.5	Fair	**12.5mm, voided, partially stripped**
TOTAL	5.0		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Pavement core at boring HIS-PC2

Course	Thickness (inches)	Conditions	Remarks
Top	1.0	Poor	**9.5mm, voided, partially stripped, fragmented, delaminated**
Binder	3.0	Fair	**19.0mm, voided, partially stripped**
TOTAL	4.0		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Pavement core at boring HIS-PC3

.

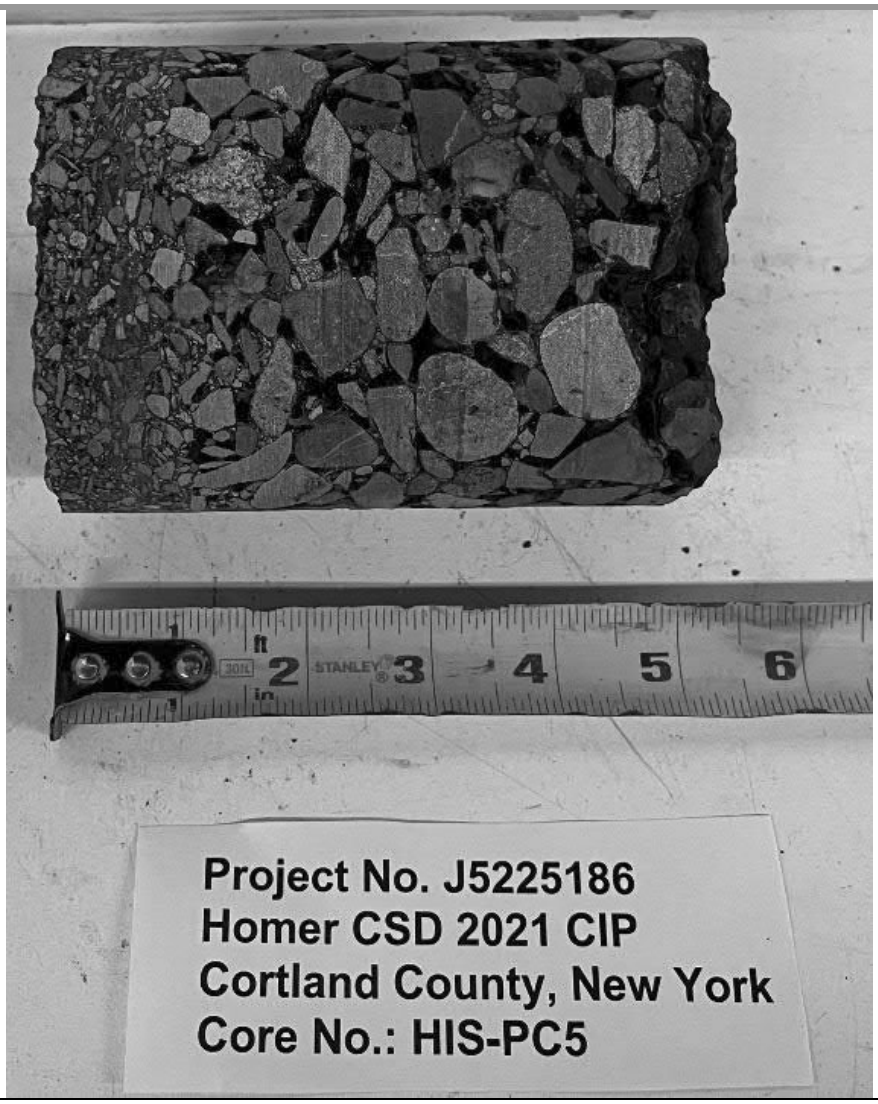
Course	Thickness (inches)	Conditions	Remarks
Top	1.5	Fair	**9.5mm, voided**
Top	2.0	Good	**12.5mm**
Binder	1.0	Fair	**19.0mm, voided, partially stripped**
TOTAL	4.5		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Pavement core at boring HIS-PC4

Course	Thickness (inches)	Conditions	Remarks
Top	1.3	Fair	**9.5mm, voided**
Permeable Binder	1.9	Fair	**19.0mm, voided**
Permeable Base	2.8	Fair	**37.5mm, voided, partially stripped**
TOTAL	6.0		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.



Pavement core at boring HIS-PC5

Course	Thickness (inches)	Conditions	Remarks
Chip Seal	0.1	N/A	**N/A**
Top	0.9	Fair	**9.5mm, voided**
Permeable Binder	2.0	Fair	**19.0mm, voided**
Permeable Binder	2.0	Fair	**25.0mm, voided**
TOTAL	5.0		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Pavement core at boring HIS-PC6

.

Course	Thickness (inches)	Conditions	Remarks
Chip Seal	0.1	N/A	**N/A**
Top	1.1	Fair	**9.5mm, voided**
Permeable Top	1.4	Fair	**12.5mm, voided**
Permeable Top	1.9	Fair	**12.5mm, voided**
Permeable Binder	2.5	Fair	**25.0mm, voided, partially stripped**
TOTAL	7.0		

Notes:
The ruler presented in the photographs is intended to provide a reference scale only. Therefore, the dimensions of the cores may not be accurately reflected in the photographs.

Project:	Homer CSD- Homer Elementary	**Project No.:**	J5225186
Weather:	81° F, Overcast to clear	**Tester :**	Lindsey Chadderdon
Presoak Date:	8/15/2022	**Test Date:**	8/16/2022

Terracon GeoReport

Test Location (In Proximity to)	Test Depth (feet)	Soil Classification	Trial Number	Water Drop (inches)	Elapsed Time (hours)	Infiltration Rate (inches/hour)
HES-IT1	10.1	Poorly Graded Sand with Gravel (SP)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
HES-IT2	10.2	Poorly Graded Sand with Gravel (SP)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
HES-IT3	10	Poorly Graded Sand with Gravel (SP)	1	24.3	1	24.3
			2	21.9	1	21.9
			3	21.6	1	21.6
			4	21.6	1	21.6
			Average infiltration rate for the four trials was 22.4 inches per hour. Infiltration rate of the final trial was 21.6 inches per hour.			
HES-IT4	10	Poorly Graded Sand with Gravel (SP)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was 24 inches per hour. Infiltration rate of the final trial was 24 inches per hour.			
HES-IT5	10	Poorly Graded Sand with Silt and Gravel (SP-SM)	1	8.6	1	8.6
			2	8.2	1	8.2
			3	8.7	1	8.7
			4	8.1	1	8.1
			Average infiltration rate for the four trials was 8.4 inches per hour. Infiltration rate of the final trial was 8.1 inches per hour.			
Testing was conducted in general accordance with Appendix D of the New York State Storm Water Management Design Manual.						

Project:	Homer CSD - High School	**Project No.:**	J5225186
Weather:	78° F, Overcast to clear	**Tester :**	Lindsey
Presoak Date:	8/15/2022	**Test Date:**	8/16/2022

Terracon GeoReport

Test Location (In Proximity to)	Test Depth (feet)	Soil Classification	Trial Number	Water Drop (inches)	Elapsed Time (hours)	Infiltration Rate (inches/hour)
HHS-IT1	10	Sandy Silt with Gravel (ML)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
HHS-IT2	9.9	Sandy Silt with Gravel (ML)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
HHS-IT3	10	Poorly Graded Sand with Gravel (SP)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
HHS-IT4	10	Poorly Graded Sand with Gravel (SP)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
HHS-IT5	9.9	Poorly Graded Sand with Gravel (SP)	1	> 24	1	> 24
			2	> 24	1	> 24
			3	> 24	1	> 24
			4	> 24	1	> 24
			Average infiltration rate for the four trials was greater than 24 inches per hour. Infiltration rate of the final trial was greater than 24 inches per hour.			
Testing was conducted in general accordance with Appendix D of the New York State Storm Water Management Design Manual.						

Project:	Homer CSD - Intermediate/Junior HS	**Project No.:**	J5225186
Weather:	84° F, Overcast, some light showers	**Tester :**	Lindsey Chadderdon
Presoak Date:	8/15/2022	**Test Date:**	8/17/2022

Test Location (In Proximity to)	Test Depth (feet)	Soil Classification	Trial Number	Water Drop (inches)	Elapsed Time (hours)	Infiltration Rate (inches/hour)
HIS-IT1	9.5	Poorly Graded Sand with Clay and Gravel (SP-SC)	1	11.8	1	11.8
			2	7.2	1	7.2
			3	5.6	1	5.6
			4	3.8	1	3.8
			Average infiltration rate for the four trials was 7.1 inches per hour. Infiltration rate of the final trial was 3.8 inches per hour.			
HIS-IT2	10.1	Sandy Silt with Gravel	1	24.8	1	24.8
			2	24	1	24.0
			3	22.8	1	22.8
			4	22.2	1	22.2
			Average infiltration rate for the four trials was 23.5 inches per hour. Infiltration rate of the final trial was 22.2 inches per hour.			
HIS-IT3	10	Poorly Graded Sand with Clay and Gravel (SP-SC)	1	6.7	1	6.7
			2	3.9	1	3.9
			3	3.9	1	3.9
			4	4.1	1	4.1
			Average infiltration rate for the four trials was 4.7 inches per hour. Infiltration rate of the final trial was 4.1 inches per hour.			
HIS-IT4	10	Sandy Silt with Gravel	1	21.4	1	21.4
			2	17.4	1	17.4
			3	15.6	1	15.6
			4	13.2	1	13.2
			Average infiltration rate for the four trials was 16.9 inches per hour. Infiltration rate of the final trial was 13.2 inches per hour.			
HIS-IT5	9.9	Poorly Graded Sand with Silt and Gravel (SP)	1	11.6	1	11.6
			2	7.6	1	7.6
			3	6	1	6.0
			4	5	1	5.0
			Average infiltration rate for the four trials was 7.6 inches per hour. Infiltration rate of the final trial was 5.0 inches per hour.			
Testing was conducted in general accordance with Appendix D of the New York State Storm Water Management Design Manual.						

Project:	Homer CSD - Intermediate/Junior HS	**Project No.:**	J5225186
Weather:	84° F, Overcast, some light showers	**Tester :**	Lindsey Chadderdon
Presoak Date:	8/15/2022	**Test Date:**	8/17/2022

Test Location (In Proximity to)	Test Depth (feet)	Soil Classification	Trial Number	Water Drop (inches)	Elapsed Time (hours)	Infiltration Rate (inches/hour)
HIS-IT6	10	Poorly Graded Sand with Silt and Gravel (SP)	1	18.6	1	18.6
			2	12.7	1	12.7
			3	11.8	1	11.8
			4	10.1	1	10.1
			Average infiltration rate for the four trials was 13.3 inches per hour. Infiltration rate of the final trial was 10.1 inches per hour.			
HIS-IT7	10	Poorly Graded Sand with Silt and Gravel (SP)	1	9.1	1	9.1
			2	7.1	1	7.1
			3	6.4	1	6.4
			4	5.6	1	5.6
			Average infiltration rate for the four trials was 7.1 inches per hour. Infiltration rate of the final trial was 5.6 inches per hour.			
HIS-IT8	10	Poorly Graded Sand with Gravel (SP)	1	25.2	1	25.2
			2	20.8	1	20.8
			3	19.2	1	19.2
			4	20.4	1	20.4
			Average infiltration rate for the four trials was 20.4 inches per hour. Infiltration rate of the final trial was 20.4 inches per hour.			
Testing was conducted in general accordance with Appendix D of the New York State Storm Water Management Design Manual.						

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS
Homer CSD 2021 CIP ■ Cortland County, NY
Terracon Project No. J5225186

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Auger Cuttings Rock Core Standard Penetration Test	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

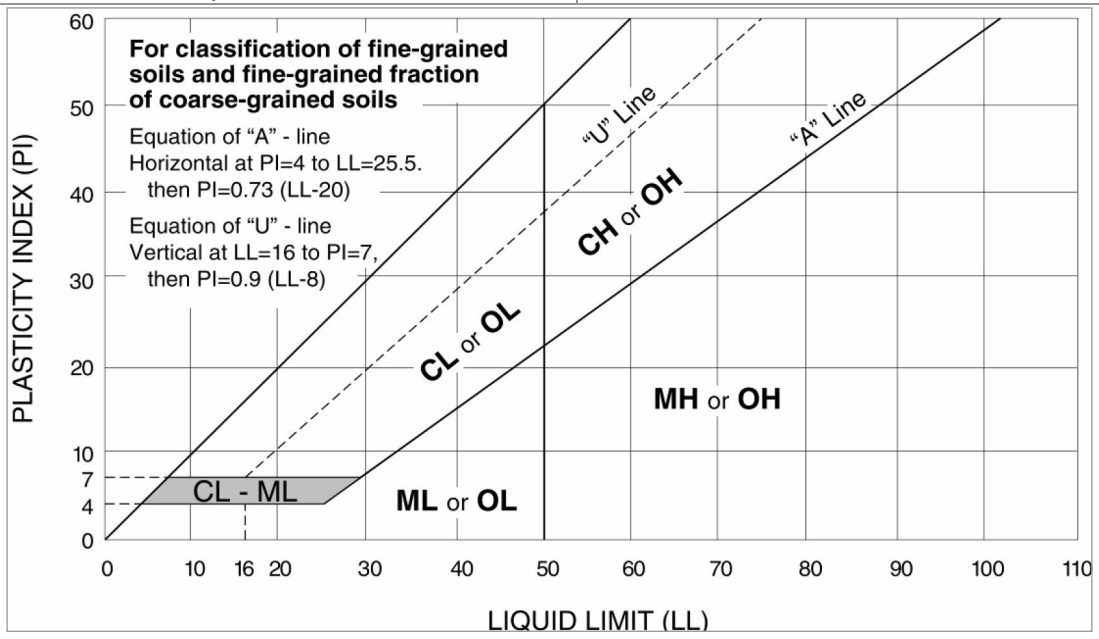
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Information To Build On
Engineering • Consulting • Testing

September 14, 2007

Mr. Michael Delair
Homer Central School District
P.O. Box 500
Homer, New York 13077-0500

Geotechnical Engineering Services Report
Proposed Building Additions
Homer Elementary School, Homer Senior High School,
and Hartnett Elementary School
Homer and Truxton, Cortland County, New York
PSI Project No. 806-75040

Dear Mr. Delair,

PSI (Professional Service Industries, Inc.) is pleased to submit three (3) copies of this Geotechnical Engineering Services Report for the above referenced project. Included in this presentation are the results of the exploration and recommendations concerning the design and construction of the foundations and pavements, as well as general site development.

We appreciate the opportunity to have provided you with our geotechnical engineering services. In this report, we recommend geotechnical monitoring of foundation construction to verify that our recommendations are implemented as intended. If you wish to have us provide these geotechnical construction-monitoring services, please contact directly. If you have any questions concerning this report or if we may be of further service in any manner, please contact our office.

Respectfully submitted,
PSI (Professional Service Industries, Inc.)

Randy Daub
Project Engineer

David B. Sabol, P.E.
Vice President

Paul Hundley
Principal Consultant

3cc: Hunt Engineers, Architects, & Land Surveyors, PC
1cc: Homer Central School District

GEOTECHNICAL ENGINEERING SERVICES REPORT

for the

PROPOSED BUILDING ADDITIONS HOMER ELEMENTARY SCHOOL, HOMER SENIOR HIGH SCHOOL, AND HARTNETT ELEMENTARY SCHOOL HOMER AND TRUXTON, CORTLAND COUNTY, NEW YORK

prepared for

HOMER CENTRAL SCHOOL DISTRICT
P.O. BOX 500
HOMER, NEW YORK 13077-0500

by

PROFESSIONAL SERVICE INDUTRIES, INC.
PSI PROJECT 806-75040

TABLE OF CONTENTS

GEOTECHNICAL ENGINEERING SERVICES REPORT

INTRODUCTION

PSI (Professional Service Industries, Inc.) has completed a subsurface exploration and geotechnical engineering evaluation for the proposed building additions. PSI's services for this project were performed in accordance with PSI Proposal No. 806-7111, dated June 6, 2007. Authorization to perform this exploration and analysis was in the form of a signed proposal by Mr. Michael Delair for the Homer Central School District.

The purpose of this study was to explore the subsurface conditions at the site to develop geotechnical recommendations for design of a foundation system for the proposed building additions and new pavement within the existing parking lot areas. This report briefly outlines the testing procedures, describes the site and subsurface conditions, and discusses the foundation recommendations. The scope of our services for this project included:

The performance of seventeen (17) soil borings to depths of about ten (10) to thirty-five (35) feet each or auger refusal, whichever was shallower.

The performance of appropriate laboratory testing, including visual engineering, classification, moisture content, and penetrometer strength tests, if warranted.

The provision of a written geotechnical report, including the following:

- A description of the soil and groundwater conditions at the borings.
- Recommendations regarding the type of foundation for the proposed building additions including allowable soil bearing pressure and estimated total and differential settlements.
- Recommendations regarding site preparation activities as they are impacted by the observed geotechnical conditions.
- Pavement recommendations for both light and heavy-duty asphalt concrete pavement.
- Comments regarding potential construction problems, based on conditions disclosed by the soil borings.

The scope of services did not include an environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, ground water or air, on, or below or around this site. Any statement in this report or on the boring records regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of the client.

Under the terms of PSI Proposal 806-7111, dated June 6, 2007, PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminate in or around any structure, or any service that was designed or intended to prevent or lower the risk of

the occurrence of the amplification of the same. As stated in the above referenced proposal, mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Site conditions are outside of PSI's control, and mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible of the occurrence or recurrence of mold amplification.

PROPOSED CONSTRUCTION

Mr. Darin Rathbun, PE of Hunt Engineers, Architects & Land Surveyors, PC provided the project information. The project is to consist of three (3) individual sites.

Homer Elementary School

Two (2) additions will be added to the existing structure. A two-story gymnasium expansion, cafeteria, and classroom addition to the northwest corner of the building, and a one-story entry addition to the east end of the building. The new additions will have a finished floor elevation matching the existing structure. The new additions are expected to consist of a metal deck roof on typical steel bar joists or long span steel joists, supported on structural steel beams and columns. Floors will be constructed with a concrete slab on metal deck supported by composite steel beams and steel columns. Steel columns will bear on reinforced concrete piers and spread footings, with perimeter strip wall footings. Slab on grade and retaining walls are anticipated. Foundation loads are anticipated to be as follows:

Interior Columns:	15 to 140 kips
Exterior Columns:	10 to 80 kips
Exterior Walls:	1.0 to 4.0 kips per lineal foot
Floor Slab:	40 to 150 psf

The existing one and three-story structure consists of an original structure built in 1925. The original building construction is a concrete pan joist system supported on bearing walls and steel columns. Load bearing walls and steel columns bear on shallow spread and strip footings. There was a one and two-story addition to the original building in 1948. The 1948 addition construction consists of a concrete slab on metal deck supported by steel joists and steel beams supported on steel columns. Columns bear on shallow spread and strip footings. The final addition is a two-story structure constructed around 1950. The existing 1950 construction is unknown at this time.

Home Senior High School and Bus Garage

One (1) two-story addition will be added to the existing structure. The addition is expected to have an open ground floor elevation and a finished first floor elevation equal to the original building elevation. The addition is anticipated to be for a cafeteria expansion and new stairwell. Retaining walls are anticipated. The construction of the new addition is expected to be a steel beam or joist and metal deck roof supported by steel beams and steel columns with a concrete slab on metal deck supported by steel beams and columns. The anticipated range of allowable

foundations is as follows:

Interior Columns:	15 to 75 kips
Exterior Columns:	15 to 75 kips
Exterior Walls:	0.5 to 1.5 kips per lineal foot
Floor Slab:	40 to 100 psf

The original three-story structure was built around 1950. The construction of the building structure is a concrete slab on metal deck floor system supported by steel joists, beams, and columns. The foundations for the building are a shallow foundation utilizing spread and strip footings. There were two (2), two to three-story additions to the original structure built in 1960 and 2003. Construction type for the 1960 addition is similar to the original construction.

Hartnett Elemenary School

No building additions are anticipated at this site. A new parking lot is proposed near the school building to the south side of the school property. No traffic data was provided for this report.

The recommendations provided in this report are based on our understanding of the project as outlined above. If any of the above information should change significantly or be in error, it should be brought to our attention so that we may review the recommendations made in this report.

TESTING PROCEDURES

Field Operations

Seventeen (17) soil test borings were performed at the sites at the approximate locations shown on the Boring Location Plans presented in the Appendix. Hunt Engineers, Architects & Land Surveyors, PC selected the boring positions. The borings were located in the field by a representative of PSI by measuring distances from known reference points as shown on the attached drawing. The ground surface elevation for the boring locations was not provided or determined for this report.

The borings were advanced into the ground using hollow stem augers. At regular intervals throughout the boring depths, soil samples were obtained with a split spoon sampler. The split spoon sampler was first seated six (6) inches to penetrate any loose cuttings and then driven an additional foot, where possible, with blows of a one hundred forty (140) pound hammer falling thirty (30) inches. The number of hammer blows required to drive the sampler each six-inch increment is recorded in the field. The penetration resistance "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during this exploration are in basic accordance with ASTM Designation D-1586.

Laboratory Testing

The soil samples obtained during the field exploration were transported to the laboratory and visually examined. The soil samples obtained from the drilling operation were classified in general accordance with ASTM D-2488 (Visual-Manual Procedure for Description of Soils). Soil classifications include the use of the Unified Soil Classification System described in ASTM D-2487 (Classification of Soils for Engineering Purposes). Water content determinations (ASTM D-2211) were also conducted. Descriptions of the soils encountered in the test boring are provided on the Boring Records included in the Appendix. Groundwater conditions, Standard Penetration Resistances and other pertinent information are also included. The soil samples that were not altered by laboratory testing will be retained at our office for sixty (60) days from the date of this report and then discarded.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The proposed building additions for the Homer Elementary School are to be located adjacent to the existing school at 9 Central Park Place, in Homer, Cortland County, New York. The proposed building additions for the Homer Senior High School and Bus Garage are to be located adjacent to the existing structures at 80 S. West Street, in Homer, Cortland County, New York. The proposed new parking lot for the Hartnett Elementary School is to be located south of the existing school at 6337 Academy Street, in Truxton, Cortland County, New York. The Boring Location Plan in the Appendix indicates the location of the borings with respect to the existing structure.

Based on visual observations of the site by a PSI engineer at the time of the field operations, the proposed construction areas appear to be relatively level with maximum elevation differences within the footprint being less than two (2) to three (3) feet. No ponded water surfaces were observed within the properties at the time of field operations.

Subsurface Conditions

The following subsurface description is of a generalized nature, provided to highlight the major soil strata encountered. The Boring Records should be reviewed for specific information as to the individual boring locations. The stratifications shown on the Boring Records represent the conditions only at the actual boring location. Variations may occur and should be expected at locations other than the boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

At test boring locations SB-1 through SB-6, SB-10, SB-11, and SB-13, topsoil was encountered having a thickness of about 3 to 7 inches. At test boring locations SB-7, SB-8, SB-9, SB-12, SB-14, SB-15, SB-16, and SB-17, asphalt concrete was encountered having a thickness of about three (3) to six (6) inches, underlain by a layer of stone base having a thickness of about three (3) to four (4) inches. The topsoil, asphalt concrete, and stone base thickness should be expected to

vary across the site.

Underlying the topsoil and/or stone base at test boring locations SB-5, SB-6, and SB-17, fill materials consisting of silt containing variable fractions of gravel, sand, brick fragments, and cinders were encountered to depths of about three and one-half (3-1/2) to six (6) feet below the existing surface grades. Based on results of SPT data, the majority of the fill materials appear to have adequate compaction.

Underlying the fill materials, topsoil cover, stone base, and/or surface grades at all test boring locations, natural soils consisting of silt, sand, clayey silt, and sandy silt containing variable fractions of clay, silt, sand, and gravel extended to the terminal depth of each test boring location.

The majority of the natural soils encountered consisted of granular soils. Within the granular natural soils, the Standard Penetration resistances, N-values, ranged from four (4) blows per foot to fifty (50) blows per four (4) inches of penetration, indicating loose to very dense relative densities. The moisture content of the natural granular soils generally ranged from moist to saturated. The soils were visually classified as "ML" and "SP" according to the Unified Soil Classification System.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring log included in the appendix should be reviewed for specific information at the boring location. The record includes soil descriptions, stratifications, penetration resistances, location of samples, and laboratory test data. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Groundwater information obtained during field operations is also shown on these boring logs. The samples which were not altered by laboratory testing will be retained for sixty (60) days from the date of this report and then will be discarded.

Groundwater Conditions

At the time of the site fieldwork on August 10-17, 2007, free water was encountered in the test boring locations SB-1 through SB-6, SB-9, SB-10, and SB-11 at depths ranging from about twelve and one-half (12-1/2) to twenty-three (23) feet below the existing surface grades. No free water was encountered in the remaining test boring locations. For safety purposes, the boreholes were backfilled at the time of drilling completion. These observations represent the groundwater conditions at the time of measurement and may not be indicative of other times. Additionally, discontinuous zones of perched water may exist within the overburden materials and the builder should anticipate surface and subsurface seepage into any subsurface excavations during high moisture periods of the year. Variations in groundwater levels should be expected seasonally, annually, and from location to location.

SITEWORK RECOMMENDATIONS

It is recommended that PSI be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI cannot accept responsibility for any conditions that deviate from those described in this report, nor for

the performance of the foundation system if not engaged to also provide construction observation and testing for this project.

Geotechnical Discussion – Existing Fill

Fill material was encountered at boring locations SB-5, SB-6, and SB-17 to depths of about three and one-half (3-1/2) to six (6) feet below the existing surface grades. The fill materials consisted predominately of silt containing variable fractions of gravel, sand, brick fragments, and cinders. It should be noted that the fill material consists primarily of inorganic soils. Based on standard penetration test results, the majority of the encountered fill materials have adequate density and compaction. However, proof-compaction operations should also be performed using a minimum fifteen (15) ton smooth drum vibratory roller, operating in the vibratory mode, to confirm suitability. Please note that borings are widely spaced, and conditions may differ between borings. Additionally, as is the case with any fill placed without monitoring and testing, the possibility exists that the fill may contain deleterious material not disclosed by our exploration.

Site Preparation

Unless specifically indicated otherwise in the drawings and/or specifications, the limits of this subsurface preparation are considered to be that portion directly beneath and ten (10) feet beyond the building and appurtenances. Appurtenances are those items attached to the building and typically include, but are not limited to, the building sidewalks, porches, stoops, etc.

Site preparation should commence with the removal of any existing foundations, walls and slabs, topsoil, vegetation, pavements and any deleterious materials within the building and parking areas. PSI recommends that any topsoil, and any soft or deleterious soils in the construction areas be stripped from the site and either wasted or stockpiled for later use in landscaping. A representative of the geotechnical engineer should determine the depth of removal at the time of construction. Underground storage tanks, abandoned utilities, any existing undetected foundations or other features not evident at the time of our investigation should also be removed. In general, existing foundations, floors slabs, pavements, topsoil, trees, roots, vegetation and other deleterious materials should be completely stripped from the construction site area. Depending upon the time of year construction commences, the upper twelve (12) to eighteen (18) inches of soils may need to be scarified and aerated or removed and replaced depending upon the soils in-place moisture content.

PSI has not been provided with any grading plans. Additional site preparation will depend upon the proposed site grades and building features. Prior to the beginning of fill placement activities, PSI recommends that all areas receiving new fill be proof-compacted. Proof-compaction operations should be performed using a minimum fifteen (15) ton smooth drum vibratory roller, operating in the vibratory mode making a minimum of four (4) passes. Proof-compaction operations should be observed by a representative of PSI and should continue until an unyielding condition exists. Unstable soils which are revealed by proof-compaction and which cannot be adequately densified in place, should be removed and replaced with crushed limestone (NYSDOT 304) or similar material under the recommendations of the PSI representative.

During the site area grading, zones of perched groundwater may be encountered. Local undercutting and pumping to remove water may be required when such zones are encountered, and provisions should be made in this regard by the builder.

After subgrade preparation and observation have been completed, fill placement may begin. The first layer of fill material should be placed in a relatively uniform horizontal lift and be adequately keyed into the stripped subgrade soils.

During site preparation, filled sidewalk vaults, burn pits, old foundations, trash pits or other isolated disposal areas may be encountered. All too frequently such buried material occurs in isolated areas outside boring locations. Any such material encountered during site work or foundation construction should be excavated and removed from the site.

Structural Fill

Materials selected for use as structural fill should not contain more than two (2) percent by weight of organic matter, waste construction debris, or other deleterious materials. Fill materials should generally have a modified Proctor maximum dry density greater than one hundred ten (110) pounds per cubic foot (pcf), a maximum particle size of less than three (3) inches, and have less than twenty (20) percent of the soils passing the number 200 sieve. Structural fill should consist of non-expansive materials.

Based on the results of soil classifications, the existing near surface soils at the project site generally consist of sand and silt and are considered suitable for reuse as structural fill as long as the soils are within an acceptable moisture condition. It must be recognized that soils that contain silt and clay are difficult to dry during wet or cool seasons. Careful attention to moisture content and compactive effort is important in dealing with such soils. It is not unusual for wet or cool season grading operations to be hindered by the continual need to dry back the on-site natural soils during placement. If fill placement must proceed during other than the summer months, the use of imported granular fill with less than ten (10) percent passing the No. 200 sieve may be necessary.

Fill material in "mass" fill areas should be placed and compacted in individual lifts of eight (8) inches or less loose measurement using a vibratory roller. Within small excavations such as in utility trenches, around manholes, or behind retaining walls, we recommend the use of smaller, hand or remote-guided equipment. A loose lift thickness of four (4) inches or less is recommended when using such equipment.

PSI recommends that structural fill be compacted to a minimum of ninety-five (95) percent of the maximum dry density and within plus or minus three (3) percent of the optimum moisture content, as determined by ASTM D-1557, modified Proctor. A representative of PSI should observe fill placement operations and perform density tests concurrently to indicate if the specified compaction is being achieved.

Drainage and Groundwater Considerations

Proper perimeter drainage mechanisms should be provided along all exterior foundation members. The elevation of the drainage lines should be adjusted to keep water a minimum of two (2) feet below the design elevation. A free flowing granular drainage fill such as crushed stone is to be employed around all drainage lines with the granular drainage fill encased in a geotextile filter fabric. The perimeter drains should discharge to a storm sewer or drainage ditch by gravity.

Water should not be allowed to collect near or below the foundation areas of the building additions either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater or surface runoff. Positive site drainage should be provided at all times to reduce infiltration of surface water around the perimeter of the building. All grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill of the building. It is anticipated that foundation excavations and construction control of any water can be accomplished with a sump pumping from a properly filtered open sump. Seasonal variations in the groundwater level should be anticipated.

Floor Slab and Pavement Subgrade Preparation

Based on the relatively silty and/or clayey nature of site soils and the wet conditions encountered during this investigation, the near surface soils present at this site will be sensitive to softening due to rainfall and traffic. When damp or wet, it is our experience that these soils tend to rut severely under rubber-tired vehicle traffic. Additionally, the operation of heavy rubber tired equipment on these soils will often shear the surficial soils even at optimum moisture. Rigorous maintenance of entrance roads and other areas subjected to construction traffic, such as floor slab and pavement areas, is typically required until floor slab and pavement construction is completed and may need to be periodically replenished. In some instances it is advantageous to place a working course of compacted graded aggregate base over building areas between the time of initial grading and final floor slab and/or pavement construction. The graded aggregate base should be end dumped outside of building and pavement areas and spread out with lightweight equipment that will not adversely affect the subgrade soils. The graded aggregate base may need periodic replenishment depending on weather and traffic conditions during construction.

PSI recommends that the floor slab and pavement subgrades be evaluated by a representative of the Geotechnical Engineer immediately prior to placing stone and beginning floor slab and pavement construction. If low consistency soils are encountered which cannot be adequately densified in place, such soils should be removed and replaced with well-compacted fill material placed in accordance with the *Structural Fill* section of this report or with well-compacted crushed stone materials.

Federal Excavation Safety Regulations and Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction

Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. Based on our review of the OSHA regulations, it is anticipated that the site soils may be classified as OSHA Type C, require a temporary cut slope not steeper than 1.5H:1V. However, the contractor's "responsible person" must make the final decision regarding OSHA soil type and safe excavation slopes. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

PSI is providing this information solely as a service to our client. PSI is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred. Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a sudden collapse of the embankment.

FOUNDATION AND FLOOR SLAB RECOMMENDATIONS

Shallow Foundations

Based on the findings at the boring locations during the geotechnical exploration, it appears the proposed building can be supported on conventional shallow continuous wall spread footings designed for a maximum net allowable soil bearing pressure of 3,000 psf, when founded on the granular soils and/or engineered fill. The allowable bearing pressure is based on a minimum safety factor of 3.0 and is intended for dead loads and sustained live loads. The bottom of the footing excavations may be wet and/or loose and the surface may be required to be compacted with either a vibratory or an impact compactor, i.e. jumping jack. Continuous wall footings should be at least eighteen (18) inches in width. Wall footings should extend to a minimum depth of forty-eight (48) inches beneath the lowest adjacent exterior grade to provide adequate frost protection. In heated areas, interior footings can be located at a minimum depth of eighteen (18) inches below finished floor elevations.

Adjacent to any existing basement wall, the new footing should be stepped down to match the bearing elevation of the existing footing. The new footing should not bear on existing basement wall backfill. The footings should be stepped down in maximum height two (2)-foot steps at a maximum average of 2H:1V. In addition where new footings are situated within a distance of 2B (B-footing width) from the edge of the footings of the existing foundation members, the new

footing's bearing elevations should match the existing footing's bearing elevations. The addition should be structurally separated from the existing building with expansion joints provided.

The settlement of shallow foundations supported on engineered fill or suitable natural soils are anticipated to be measurable, but tolerable for the type of construction proposed. PSI estimates that foundations designed and constructed in accordance with the above recommendations will experience total settlements generally less than one (1)-inch with differential settlement generally less than three-quarters (3/4)-inch. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the structural engineer should confirm the tolerance of the proposed structure to the predicted total and differential settlements. While settlement of this magnitude is generally considered tolerable for the proposed construction, the design of any building masonry walls should include provisions for additional reinforcing steel and vertical control joints to limit the affects of cosmetic cracking.

The foundation walls may not be free standing in the overburden soils; therefore the sides of the cut excavation for the footings may need to be sloped and the footings formed and backfilled in order to maintain a vertical concrete face.

Footing soils need to be observed and documented and concrete placed as quickly as possible to avoid exposure of the bottom of footing soils to disturbance due to construction traffic, drying or water accumulation. If concrete will not be placed the same day a foundation excavation is cut to grade, the contractor should be required to place three (3) to five (5) inches of compacted crushed aggregate within the footing excavation.

The foundation excavations should be observed by a representative of PSI prior to steel or concrete placement to document that the foundation materials are consistent with the report.

Floor Slab Design

The proposed building slab-on-grade may be supported on natural soils or compacted engineered fill placed over a natural soil subgrade, provided the upper soils have been proof-rolled with fully loaded tandem-axle dump truck or a minimum fifteen (15) ton smooth drum vibratory roller, operating in a vibratory mode, making a minimum of 4 passes in order to confirm their suitability. Any observed soft/loose or otherwise unsuitable areas should be over-excavated down to firm subgrade and replaced with compacted engineered fill.

For the subgrade prepared as recommended and properly compacted fill, a modulus of subgrade reaction, *k* value, of 120 pounds per cubic inch (pci) may be used in the grade slab design based on a one (1) foot by one (1) foot plate load test. However, depending on how the slab load is applied, the value will have to be geometrically modified. The value should be adjusted for larger areas using the following expression for cohesive and cohessionless soil:

Modulus of Subgrade Reaction, $k_s = \frac{k}{B}$ for cohesive soil and

$k_s = k\left(\frac{B+1}{2B}\right)^2$ for cohessionless soil and

where: k_s = coefficient of vertical subgrade reaction for loaded area,
k = coefficient of vertical subgrade reaction for 1 x 1 square foot area,
B = width of area loaded, in feet.

In order to provide uniform subgrade reaction beneath any proposed floor slab-on-grade and provide separation between moderate potentially expansive soil, we recommend that floor slabs be underlain by a minimum of six (6) inches of free-draining (a maximum particle size of ¾-inch with less than five (5) percent material passing the no. 200 sieve), well-graded gravel or crushed rock base course. Base course material should be moisture conditioned to within plus or minus two (2) percent of optimum moisture content and compacted by mechanical means to a minimum of ninety-five (95) percent of the material's maximum dry density as determined in accordance with ASTM D-1557 (Modified Proctor).

The crushed stone should provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired, a vapor retarding membrane may also be incorporated into the design. Factors such as cost, special considerations for construction, and the floor coverings suggest that the architect and owner make decisions on the use of vapor retarding membranes.

PSI recommends that a vapor retarder be used only when required by the intended use and that installation be in accordance with ACI 301.4.1.5 and be placed under a minimum 4 inches of trimmable, compactable, granular fill (not sand).

The precautions listed below should be followed for construction of slabs-on-grade pads. These details will not reduce the amount of movement, but are intended to reduce potential damage should some settlement of the supporting subgrade take place. Some increase in moisture content is inevitable as a result of development and associated landscaping. However, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

Cracking of slabs-on-grade is normal and should be expected. Cracking can occur not only as a result of heaving or compression of the supporting soil and/or bedrock material, but also as a result of concrete curing stresses. The occurrence of concrete shrinkage cracks, and problems associated with concrete curing may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement, finishing, and curing, and by the placement of crack control joints at frequent intervals, particularly, where re-entrant slab corners occur. The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions. For example, joints are recommended at a maximum spacing of 12 feet assuming a four-inch thick slab. PSI also recommends that the slab be independent of the foundation walls. Using fiber reinforcement in the concrete can also control shrinkage cracking. Areas supporting slabs should be properly moisture conditioned and compacted. Backfill in all interior and exterior water and sewer line trenches should be carefully compacted.

Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

Below-Grade Walls

Below-grade retaining walls for portions of the building additions below-grade should be backfilled with granular materials meeting the requirements of NYDOT #304 or similar aggregate. A minimum two (2) feet of freely draining material should be placed against below-grade walls with the drainage material bearing in direct contact to a footing drain. In unpaved areas outside of the building, the uppermost two (2) feet of the backfill should consist of compacted clay, to reduce water accumulation in the backfill. As a minimum, backfill which will not be used for structural support should be compacted to the degree where it is stable under construction equipment. Backfill which will be used for structural support (i.e. floor slabs, pavements, etc.) should be compacted to meet the requirements for engineered fill as outlined in the Site Preparation section of this report.

A wall which is free to rotate about the base such that the top of the wall moves in a minimum of 0.001 times the height of the wall will generally develop active earth pressures. Walls which are restrained against rotation, and move less than this value, should be designed for at-rest earth pressure. In general, below-grade walls with restraint provided by the floor above do not undergo sufficient movement to attain active earth pressure, and should be designed for at-rest earth pressure.

Recommended equivalent fluid pressure parameters, which incorporate both lateral earth and water pressure against a below grade wall backfilled with granular engineered fill, are summarized below:

	Above Water Level	Below Water Level
Equivalent Fluid Pressure (at rest)	60 pcf	90 pcf
Equivalent Fluid Pressure (active)	40 pcf	80 pcf

It is particularly important that perimeter drains be provided outside of below-grade walls. Provided drains are installed, walls need not be designed for water pressure. Perimeter drains should consist of a 6 inch diameter perforated (PVC) pipe, placed in a compatible granular filter material such as NYDOT No. 8 coarse aggregate and wrapped with a suitable non-woven geotextile filter fabric. The drain should be placed at bottom of footing level. The perimeter drain should be routed to the storm sewer system by gravity, if practical.

The below-grade floor slab should be protected by an underfloor drainage system consisting of coarse freely draining aggregate placed over a subgrade that slopes to a sump pump system. Considering the size of the below-grade portion of the site, multiple sump locations are recommended.

To reduce the risk of water infiltration, waterstops should be provided at all construction joints, and below-grade walls should be suitably waterproofed.

Any surcharge loads on floor slabs or the ground surface within a distance of twenty (20) feet from the outside face of the wall should be included in the design of the wall. PSI recommends a lateral surcharge be determined by multiplying the coefficient of at-rest earth pressure Ko=0.5 by the

surcharge stress. PSI can evaluate specific anticipated loads, if requested.

The recommendations of this section apply to below-grade walls. If other retaining walls are planned on the site, PSI should be consulted to provide specific recommendations relative to the planned locations and heights of the walls.

Seismic Design Considerations

The project site is located within a municipality that employs the International Building Code, 2002 edition. As part of this code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event as well as the properties of the soils that underlie the site. As part of the procedure to evaluate seismic forces, the code requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper 100 feet of the ground surface. To define the Site Class for this project, we have interpreted the results of soil test borings drilled with the project site and estimated appropriate soil properties below the base of the borings to a depth of 100 feet, as permitted by Section 1615.1.1 of the code. The estimated soil properties were based upon data available in published geologic reports as well as our experience with subsurface conditions in the general site area.

Based upon our evaluation, it is our opinion that the subsurface conditions within the site are consistent with the characteristics of Site Class D as defined in Table 1615.1.1 of the building code.

Based on Figures 1615(1) and 1615(2), the mapped spectral accelerations for short periods (S_S) and the mapped spectral accelerations for a 1-second period (S_1) are about 0.166g and 0.058g, respectively (where g is the acceleration of gravity). Based on Tables 1615.1.2(1) and 1615.1.2(2), the site coefficients F_a and F_V are 1.60 and 2.40, respectively. Thus, based on equations 16-38 and 16-39, the maximum considered earthquake spectral response for short periods (SMS) and at 1-second period (SM1), adjusted for site class effects are about 0.265g and 0.139g, respectively. In addition, based upon equations 16-40 and 16-41, the five-percent damped design spectral response acceleration at short periods (SDS) and at 1-section period (SD1) are 0.177g and 0.092g, respectively.

The Seismic Design Category, as determined for the intended building use (Category II Building) and the IBC Tables 1613.3(1) and 1616.3(2), is interpreted to be B. For such a Design Category, the code does not require an assessment of slope stability, liquefaction potential, and surface rupture due to faulting or lateral spreading.

PAVEMENT RECOMMENDATIONS

Pavement design will include proper preparation of subgrade sectors, careful design of the pavement area surface drainage systems and utilization of an aggregate base course with asphalt concrete or concrete surface course. Preparation of pavement subgrades in parking and drive areas should be in accordance with recommendations outlined in the *Site Preparation* section of the report.

Inclusion of adequate surface and subsurface drainage systems is considered imperative in order to maintain the compacted subgrades as close to optimum moisture conditions as possible. Overall surface grades should be such that no pavement sectors are allowed to impound water. Surface water should be directed to a system of catch basins, and stub or finger drains should be installed at catch basins to aid in removal of water from the base course. All pavements should be sloped a minimum of one (1) percent to provide rapid surface drainage. Water allowed to pond on or adjacent to the pavement could saturate the subgrade and cause premature pavement deterioration. Stub drains should be installed on the outside of the catch basins to provide drainage of seepage water. This will prevent seepage from collecting in the somewhat impervious pavement thickness.

Asphalt Pavement

Based on PSI's experience and using a design California Bearing Ratio (CBR) value of 4 or less for the subgrade soils, a design life period of twenty (20) years suggests the following pavement thicknesses. For entrance, truck and driveway areas, recommendations are based on traffic not exceeding five (5) equivalent eighteen (18)-kip single axle loads (ESALs) per day and car parking areas not exceeding two (2) ESAL's per day. If the anticipated traffic exceeds these values, PSI should be informed so that a specific pavement design can be made for the project, or the site civil engineer can modify the design.

A typical asphalt pavement section would be:

Table 1. Typical Asphalt Pavement Section

Pavement Materials	Recommended Pavement Thickness (inches)	
	Light Duty Section	Heavy Duty Section
Asphaltic Wearing Course	1½	1½
Asphaltic Binder Course	2½	3
Crushed Aggregate Base (304 Type II)	10	12

A light-duty section is recommended in typical parking areas where cars and lightly loaded trucks are anticipated. A heavy-duty pavement section should be utilized in paved areas where traffic flow is channelized and/or delivery trucks will travel.

The asphaltic surface course and asphaltic binder course should meet the requirements of the New York State Department of Transportation. The aggregate base should meet the requirements of NYSDOT 304 type 2 stone. Asphalt cements meeting the requirements of NYSDOT Type 3 Binder and Type 7, 7F Top should be used in the production of the bituminous mixtures. In general,

pavement construction should be performed in accordance with New York State Department of Transportation specifications unless otherwise noted.

Base course material should be moisture conditioned to within two (2) percent of optimum moisture content and compacted by mechanical means to a minimum of ninety-five (95) percent of the material's maximum dry density as determined in accordance with ASTM D 1557 (Modified Proctor). Fill materials should be placed in layers that, when compacted, do not exceed about eight (8) inches. The asphaltic concrete material should be compacted to at least ninety-two (92) percent of the material's theoretical maximum density as determined in accordance ASTM D 2041 (Rice Specific Gravity).

Concrete Pavement

Rigid concrete pavement is recommended where trash dumpsters are to be parked on the pavement or where a considerable load is transferred from relatively small steel wheels. This should provide better distribution of surface loads to subgrade without causing deformation of the surface.

PSI recommends that concrete pavement be designed for a modulus of subgrade reaction of 120 pci.

A typical concrete pavement section would be:

Table 2. Typical Concrete Pavement Section

	Thickness	
Material	**Driveways, Trash Enclosures, Truck Parking**	**Car Parking**
Concrete (4,000 psi)	7 inches	5 inches
Leveling Course (No. 304 Type II)	6 inches	6 inches

During site preparation, filled sidewalk vaults, burn pits, old foundations, trash pits or other isolated disposal areas may be encountered. All too frequently such buried material occurs in isolated areas outside boring locations. Any such material encountered during site work or foundation construction should be excavated and removed from the site.

GENERAL COMMENTS

The recommendations submitted are based on the available soil information obtained by PSI and preliminary design details furnished by Hunt Engineers, Architects & Land Surveyors, PC for the proposed building additions. If there are any revisions to the plans for the proposed structure, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be retained to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the performance of the structure.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practices in the local areas. No other warranties are implied or expressed.

After the plans and specifications are more complete, it is recommended that the geotechnical engineer be provided the opportunity to review the final design and specifications to determine if the engineering recommendations have been properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of the Homer Central School District for the specific application to the proposed building additions to the existing Homer Elementary School, Homer Senior High School and Bus Garage, and Hartnett Elementary School located in Homer and Truxton, Cortland County, New York.

APPENDIX

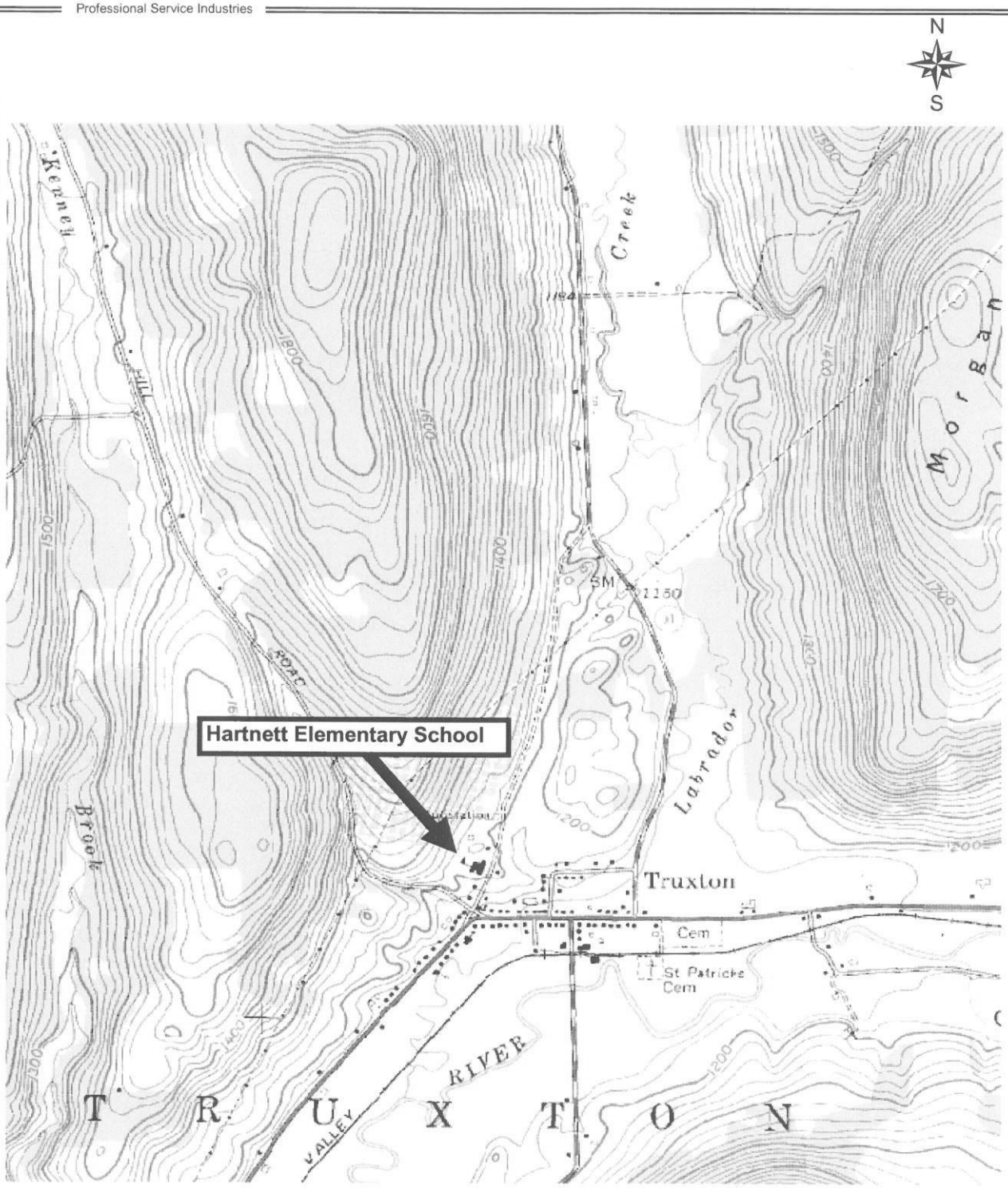
Site Vicinity Plans

Boring Location Plans

And General Notes

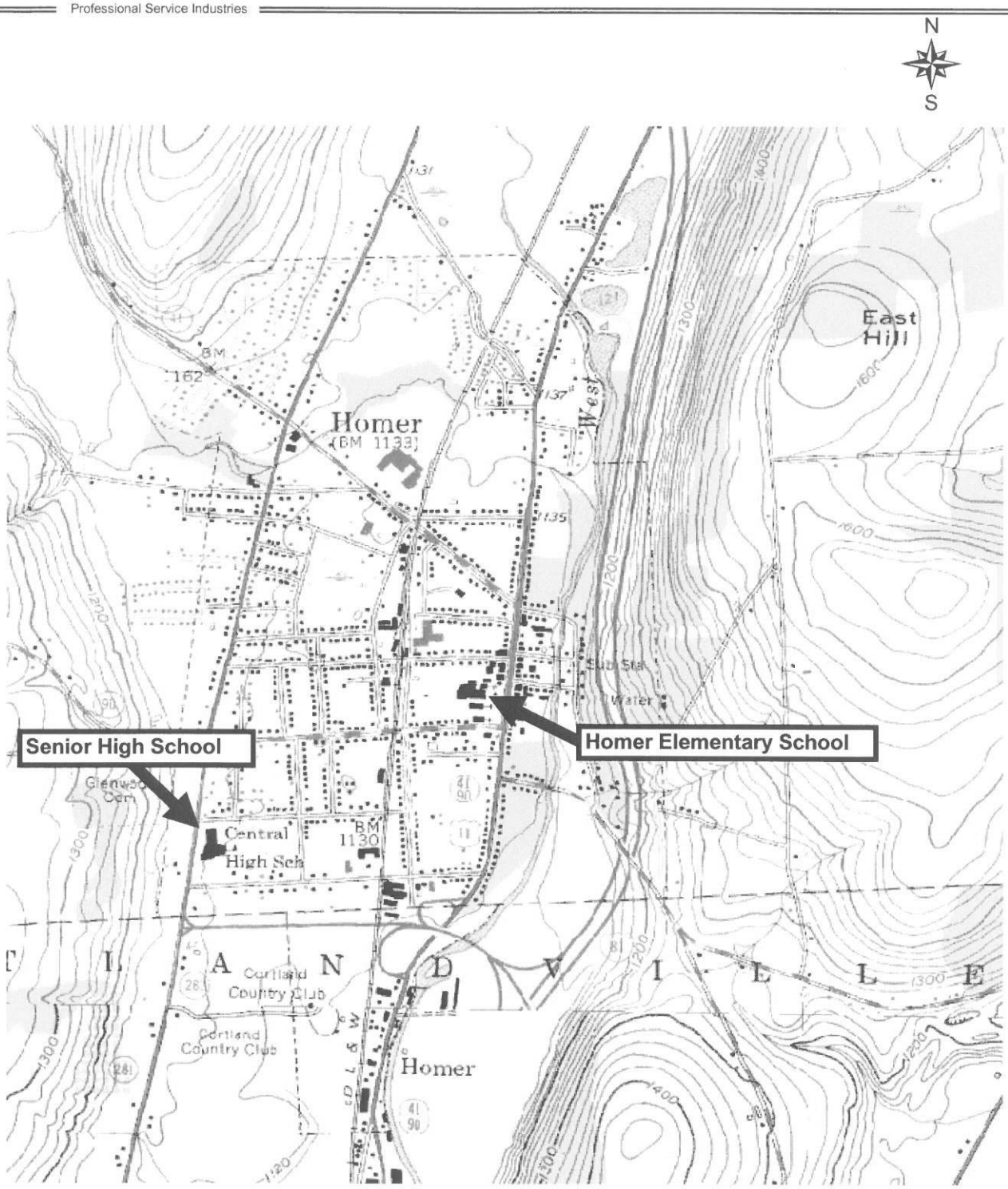
Boring Records (SB-1 thru SB-17)

U.S.C.S. Soil Classification



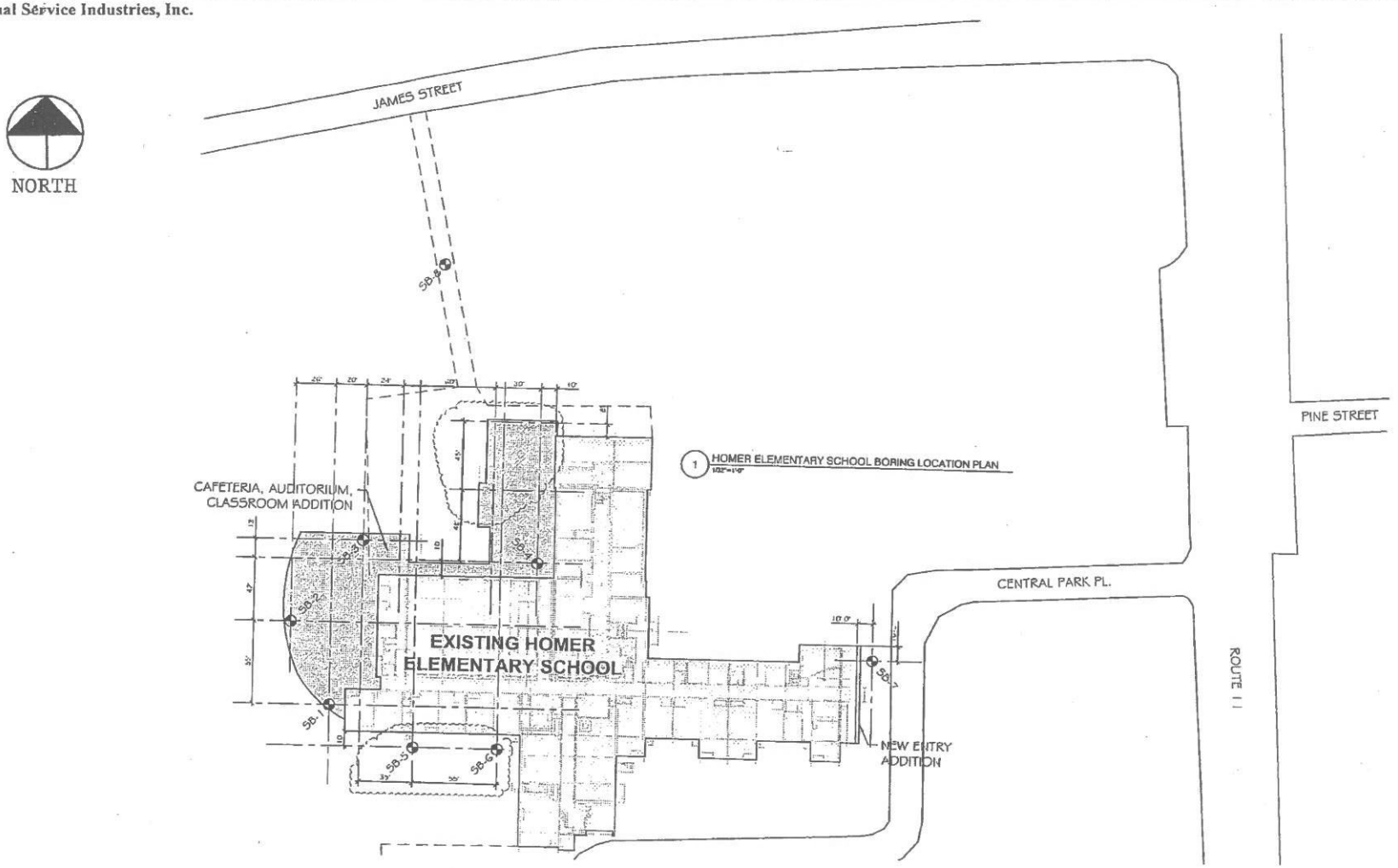
Project Name: Hartnett Elementary School Truxton, Cortland County, New York	NOT TO SCALE Base map obtained from Topozone.com	
	Project No.: 806-75040	Date: September 13, 2007

Professional Service Industries



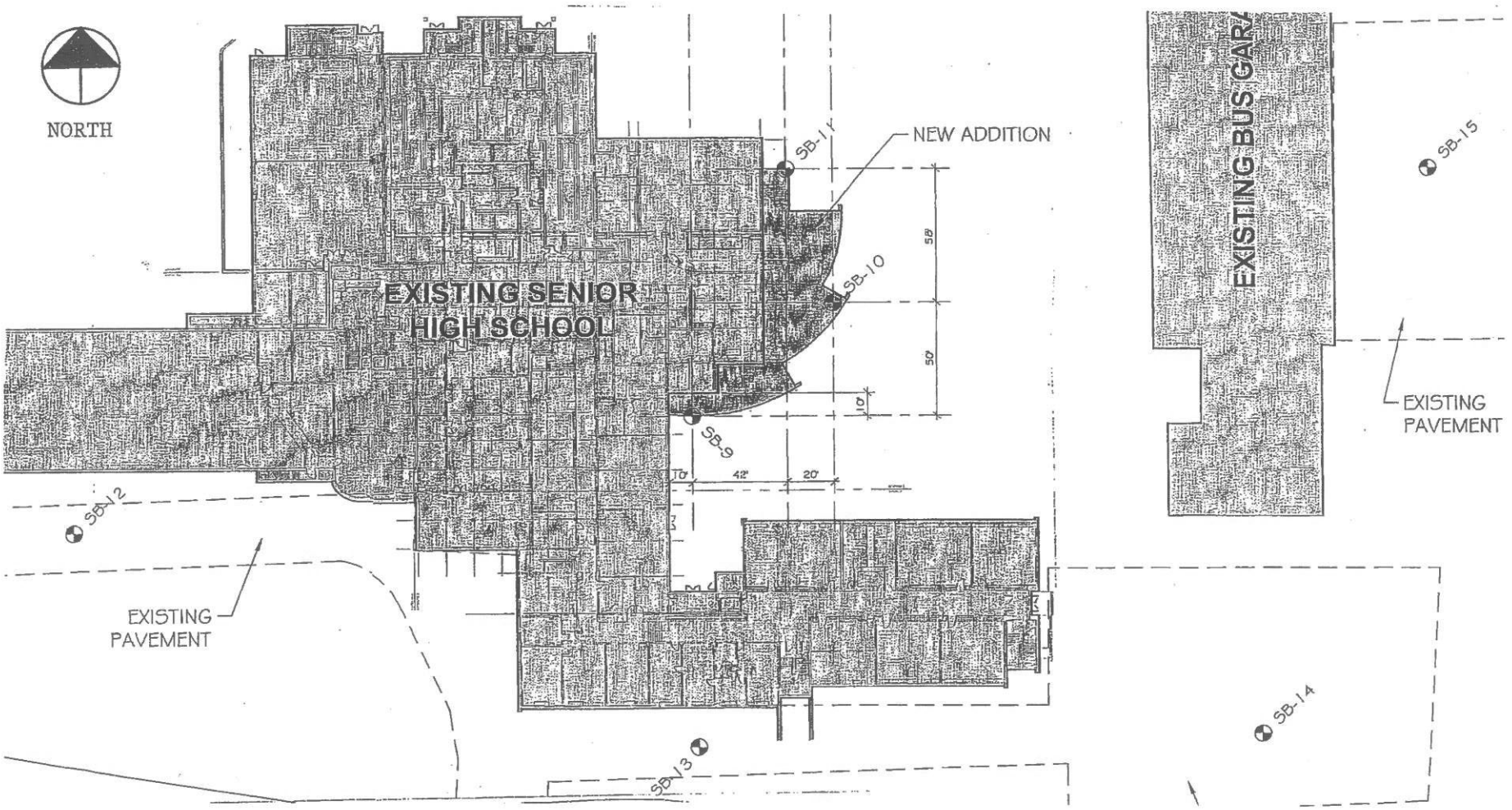
Project Name: Proposed School Additions Homer Central School District Homer, Cortland County, New York	NOT TO SCALE Base map obtained from Topozone.com	
	Project No.: 806-75040	Date: September 13, 2007

Professional Service Industries, Inc.



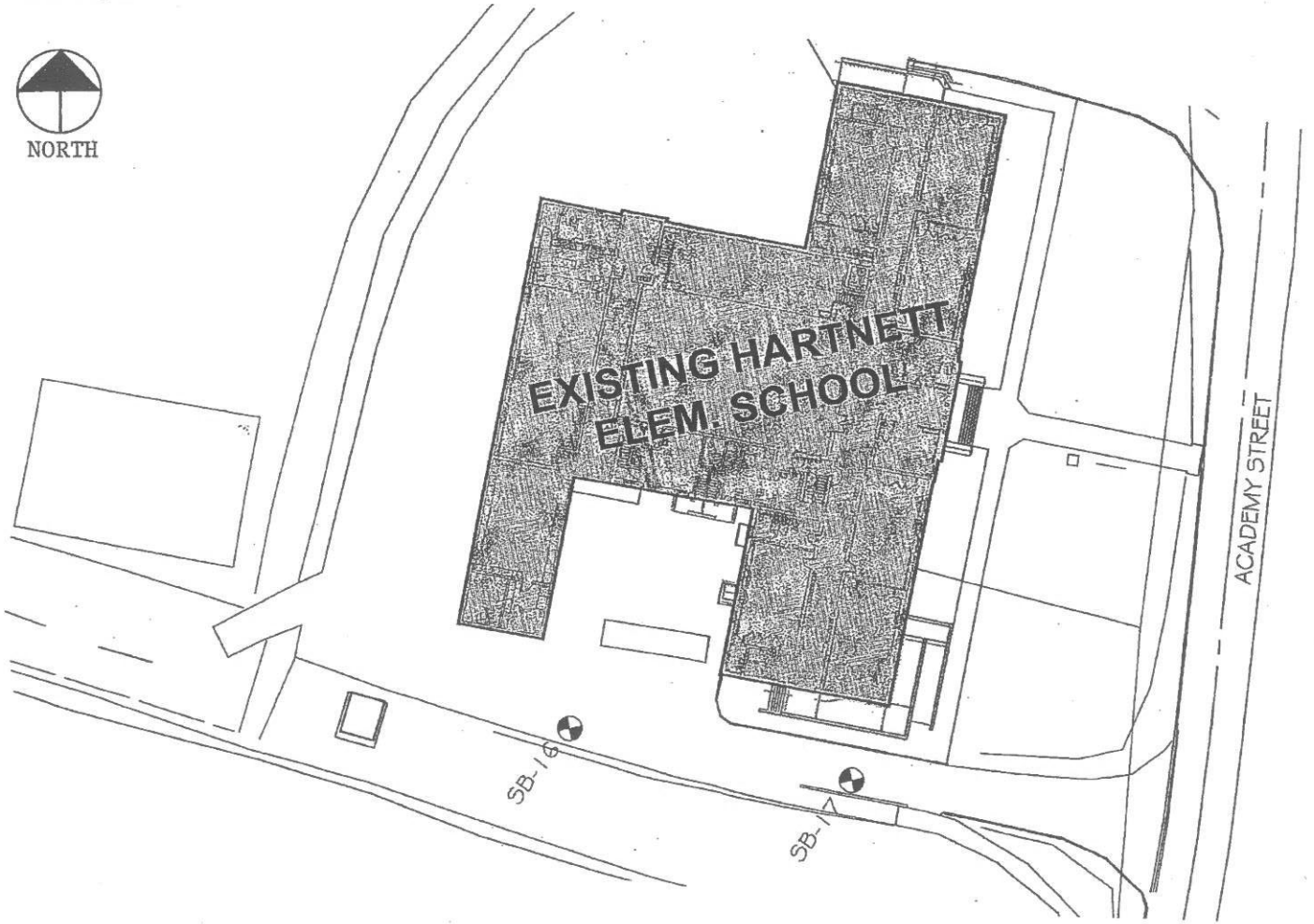
PROJECT NAME		PROJECT NO.
Proposed School Additions Homer Elementary School 9 Central Park Place Homer, Cortland County, New York	Boring Location Plan	806-75040
		DATE September 13, 2007

Professional Service Industries, Inc.



PROJECT NAME		PROJECT NO.
Proposed School Additions Homer Senior High School 80 S. West Street Homer, Cortland County, New York	Boring Location Plan	806-75040
		DATE September 13, 2007

Professional Service Industries, Inc.



PROJECT NAME		PROJECT NO.
New Parking Lot Areas Hartnett Elementary School 6337 Academy Street Truxton, Cortland County, New York	Boring Location Plan	806-75040
		DATE September 13, 2007

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-1** **(1 of 1)** | Total Depth **25.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/15/07** | Completed: **8/15/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.3	4" Topsoil		0.0			
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, medium dense to very dense, moist to saturated (SP)	30	1.5		30	--
				3.5			
			48	5.0		48	--
				6.0			
			50/3"	8.3		100	--
				8.5			
			64	10.0		64	--
		Cobbles and Boulders Noted					
				13.5			
			35	15.0		35	--
				18.5			
			61	20.0		61	--
				23.5			
	25.0		40	25.0		40	--
		End of Boring @ 25'					
		Water Encountered @ 13'					
		Upon Auger Removal, Hole Caved @ 5'					

BL_STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-2** **(1 of 1)** | Total Depth **30.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/16/07** | Completed: **8/16/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.6	7" Topsoil		0.0			
		Silt, some coarse to fine sand and medium to fine gravel, brown, medium dense, moist (ML)	26	1.5		26	--
				3.5			
			22	5.0		22	--
	6.0			6.0			
		Coarse to Fine Sand and Medium to Fine Gravel, little silt, brown, medium dense to very dense, moist to saturated (SP)	48	7.5		48	--
				8.5			
			39	10.0		39	--
				13.5			
			36	15.0		36	--
		Cobbles and Boulders Noted		18.5			
			50/4"	18.8		100	--
				23.5			
			78	25.0		78	--
				28.5			
	30.0		39	30.0		39	--
		End of Boring @ 30'					
		Water Encountered @ 13.5'					
		Upon Auger Removal, Hole Caved @ 4'					

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-3** **(1 of 1)** | Total Depth **25.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/16/07** | Completed: **8/16/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.6	7" Topsoil Silt, little coarse to fine sand and medium to fine gravel, brown, medium dense to dense, moist (ML)	17	0.0 1.5		17	--
				3.5			
			33	5.0		33	--
				6.0			
			43	7.5		43	--
				8.5			
		Cobbles and Boulders Noted	38	10.0		38	--
	13.5	Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, dense to very dense, saturated (SP)	51	13.5 15.0		51	--
			50/5"	18.5 18.9		100	--
		Cobbles and Boulders Noted		23.5			
	25.0		45	25.0		45	--
		End of Boring @ 25' Water Encountered @ 12.5' Upon Auger Removal, Hole Caved @ 5'					

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-4** **(1 of 1)** | Total Depth **25.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/17/07** | Completed: **8/17/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.4	5" Topsoil Silt, little coarse to fine sand, little to trace medium to fine gravel, brown, loose to medium dense, moist (ML)	15	0.0 1.5		15	--
				3.5			
			7	5.0		7	--
				6.0			
			9	7.5		9	--
	8.5			8.5			
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, medium dense to very dense, moist to saturated (SP)	20	10.0		20	--
				13.5			
			50/4"	15.0		100	--
				18.5			
		Cobbles and Boulders Noted	64	20.0		64	--
				23.5			
	25.0		55	25.0		55	--
		End of Boring @ 25'					
		Water Encountered @ 13'					
		Upon Auger Removal, Hole Caved @ 6'					

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-5** **(1 of 1)** | Total Depth **20.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/14/07** | Completed: **8/14/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N	Qp (tsf)
	0.5	6" Topsoil	25	0.0	25	--
		Silt, little coarse to fine sand and fine gravel, trace brick and cinders, brown, medium dense, moist (FILL)		1.5		
	3.5			3.5		
		Silt, and coarse to fine sand and medium to fine gravel, brown, dense to very dense, moist (ML)	61	5.0	61	--
				6.0		
			51	7.5	51	--
				8.5		
			43	10.0	43	--
		Cobbles and Boulders Noted				
	13.5			13.5		
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, dense to very dense, moist (SP)	41	15.0	41	--
				18.5		
	20.0		51	20.0	51	--
		End of Boring @ 20'				
		Water Encountered @ 13.5'				
		Upon Auger Removal, Hole Caved @ 5'				

N VALUE (bpf): PL — %MC — LL; 10 20 30 40 50 60 70 80 90

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BL STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-6 (1 of 1)** | Total Depth **25.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/15/07** | Completed: **8/15/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL 10 20 30 40 50 60 70 80 90	N	Qp (tsf)
	0.4	5" Topsoil	16	0.0		16	--
		Silt, some coarse to fine sand, and fine gravel, trace brick and cinders, brown, medium dense, moist (FILL)		1.5			
	3.5			3.5			
		Silt, and coarse to fine sand and medium to fine gravel, medium dense to very dense, brown, moist (ML)	16	5.0		16	--
				6.0			
			51	7.5		51	--
				8.5			
			39	10.0		39	--
		Cobbles and Boulders Noted					
	13.5			13.5			
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, dense to very dense, saturated (SP)	53	15.0		53	--
				18.5			
			35	20.0		35	--
		Cobbles and Boulders Noted		23.5			
	25.0		44	25.0		44	--
		End of Boring @ 25'					
		Water Encountered @ 13'					
		Upon Auger Removal, Hole Caved @ 5'					

BL_STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-7** **(1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/14/07** | Completed: **8/14/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL 10 20 30 40 50 60 70 80 90	N	Qp (tsf)
	0.4	5" Asphalt Concrete	14	0.0		14	--
	0.7	4" Stone Base		1.5			
		Coarse to Fine Sand, and silt, little medium to fine gravel, brown, loose to medium dense, moist to wet (SP)		3.5			
			6	5.0		6	--
	6.0			6.0			
		Coarse to Fine Sand and Medium to Fine Gravel, trace silt, brown, dense to very dense, moist (SP)	49	7.5		49	--
		Cobbles and Boulders Noted		8.5			
	10.0		71	10.0		71	--

End of Boring @ 10'

No Free Water

Upon Auger Removal, Hole Caved @ 1.5'

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-8** **(1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Homer Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/17/07** | Completed: **8/17/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.4	4" Asphalt Concrete	~~50/4"~~	0.0		100	--
	0.7	4" Stone Base					
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, dense to very dense, moist to dry (SP)		3.5			
			76	5.0		76	--
				6.0			
			45	7.5		45	--
		Cobbles and Boulders Noted		8.5			
			~~50/6"~~	9.0		100	--
	10.0						

End of Boring @ 10'

No Free Water

Upon Auger Removal, Hole Caved @ 1'

BL STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

roject: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-9** **(1 of 1)** | Total Depth **25.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/13/07** | Completed: **8/13/07** | Driller: **Carl Rengert**

Elevation	ept	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	VALU (bpf) PL % C LL (10 20 30 40 50 60 70 80 90)		Qp (tsf)
	0.4	5" Asphalt Concrete		0.0			
	0.7	4" Stone Base	34	1.5		34	--
		Silt, some coarse to fine sand and medium to fine gravel, brown, medium dense to very dense, dry to moist (ML)		3.5			
			63	5.0		63	--
				6.0			
			59	7.5		59	--
				8.5			
			62	10.0		62	--
		Cobbles and Boulders Noted					
				13.5			
			39	15.0		39	--
	16.5						
		Clayey Silt, trace fine sand, gray, loose, saturated (ML)		18.5			
			4	20.0		4	--
	23.0						
		Fine Sand, little silt, trace clay, gray, loose, saturated (SP)		23.5			
	25.0		9	25.0		9	--
		End of Boring @ 25'					
		Water Encountered @ 20'					
		Upon Auger Removal, Hole Caved @ 1.5'					

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-10 (1 of 1)** | Total Depth **35.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/14/07** | Completed: **8/14/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.5	6" Topsoil	18	0.0		18	--
		Silt, little coarse to fine sand and fine gravel, brown, medium dense, moist (ML)		1.5			
	3.5			3.5			
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, dense to very dense, moist to dry (SP)	42	5.0		42	--
				6.0			
			89	7.5		89	--
				8.5			
			35	10.0		35	--
		Cobbles and Boulders Noted		13.5			
			32	15.0		32	--
	17.0						
		Clayey Silt, little fine sand, gray, loose, saturated (ML)		18.5			
			10	20.0		10	--
				23.5			
			9	25.0		9	--
				28.5			
			10	30.0		10	--
	33.5			33.5			
	35.0	Fine Sand, little silt, trace clay, gray, medium dense, saturated (SP)	12	35.0		12	--
		End of Boring @ 35'					
		Water Encountered @ 23'					
		Upon Auger Removal, Hole Caved @ 1.5'					

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-11 (1 of 1)** | Total Depth **20.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/14/07** | Completed: **8/14/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.3	3" Topsoil	40	0.0		40	--
		Silt, little coarse to fine sand and medium to fine gravel, brown, dense, moist (ML)		1.5			
	3.5			3.5			
		Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, dense to very dense, dry to moist (SP)	71	5.0		71	--
			50/4"	6.0 8.5		100	--
			75	10.0		75	--
		Cobbles and Boulders Noted		13.5			
			44	15.0		44	--
	18.5			18.5			
		Sandy Silt, little clay, brown, medium dense, wet (ML)	11			11	--
	20.0			20.0			
		End of Boring @ 20'					
		Water Encountered @ 18.5'					
		Upon Auger Removal, Hole Caved @ 2'					

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-12 (1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/10/07** | Completed: **8/10/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.4	5" Asphalt Concrete	12	0.0		12	--
	0.7	3" Stone Base		1.5			
		Silt, some to little coarse to fine sand and medium to fine gravel, brown, loose to very dense, moist (ML)		3.5			
			9	5.0		9	--
				6.0			
			33	7.5		33	--
		Cobbles Noted		8.5			
			50/6"	9.0		100	--
	10.0						

End of Boring @ 10'

No Free Water

Upon Auger Removal, Hole Caved @ 1.5'

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BL_STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-13 (1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/13/07** | Completed: **8/13/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.5	6" Topsoil	42	0.0		42	--
		Coarse to Fine Sand and Medium to Fine Gravel, little silt, brown, dense, moist (SP)		1.5			
	3.5			3.5			
		Silt, little coarse to fine sand and medium to fine gravel, brown, medium dense, moist to wet (ML)	12	5.0		12	--
				6.0			
			19	7.5		19	--
				8.5			
	10.0		21	10.0		21	--

End of Boring @ 10'

No Free Water

Upon Auger Removal, Hole Caved @ 2'

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BL_STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-14 (1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/13/07** | Completed: **8/13/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.3	3" Asphalt Concrete	16	0.0		16	--
	0.6	3" Stone Base		1.5			
		Silt, little coarse to fine sand and fine gravel, brown, medium dense, moist (ML)		3.5			
	3.5	Coarse to Fine Sand and Medium to Fine Gravel, little to trace silt, brown, medium dense to very dense, dry to moist (SP)	24	5.0		24	--
			50/4"	6.0 8.5		100	--
		Cobbles and Boulders Noted	53	8.5		53	--
	10.0			10.0			

End of Boring @ 10'

No Free Water

Upon Auger Removal, Hole Caved @ 2.5'

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-15 (1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Homer Senior High School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/13/07** | Completed: **8/13/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL 10 20 30 40 50 60 70 80 90	N	Qp (tsf)
	0.4	5" Asphalt Concrete	10	0.0		10	--
	0.7	3" Stone Base		1.5			
		Silt, little coarse to fine sand, trace fine gravel, brown, loose to very dense, moist to wet (ML)		3.5			
			14	5.0		14	--
				6.0			
			50/6"	6.5		100	--
		Cobbles and Boulders Noted		8.5			
			37			37	--
	10.0			10.0			

End of Boring @ 10'

No Free Water

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-16 (1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Hartnett Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/17/07** | Completed: **8/17/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N	Qp (tsf)
	0.3	3" Asphalt Concrete	19	0.0		19	--
	0.7	4" Stone Base		1.5			
		Silt, little coarse to fine sand, little to trace medium to fine gravel, brown, medium dense to dense, moist to wet (ML)		3.5			
			36	5.0		36	--
				6.0			
			16	7.5		16	--
				8.5			
	10.0	Cobbles Noted	24	10.0		24	--

End of Boring @ 10'

No Free Water

Upon Auger Removal, Hole Caved @ 1.5'

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BL_STD 806-75040 HOMER SCHOOL.GPJ PSI_CORP.GDT 9/13/07

BORING LOG

PSI No.: **806-75040**

Client: **Homer Central School District**

Project: **Proposed School Additions Homer and Truxton, New York**

Boring No.: **SB-17 (1 of 1)** | Total Depth **10.0'** | Elev: **±** | Location: **Hartnett Elementary School**

Type of Boring: **Hollow-Stem Auger** | Started: **8/17/07** | Completed: **8/17/07** | Driller: **Carl Rengert**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL 10 20 30 40 50 60 70 80 90	N	Qp (tsf)
	0.5	6" Asphalt Concrete	22	0.0		22	--
	0.8	4" Stone Base		1.5			
		Silt, some coarse to fine sand, little fine gravel, brick, and cinders, brown, medium dense to loose, moist (FILL)		3.5			
			7	5.0		7	--
	6.0			6.0			
		Sandy Silt, little to trace fine gravel, brown, medium dense, moist (ML)	20	7.5		20	--
				8.5			
	10.0		23	10.0		23	--
		End of Boring @ 10'					
		No Free Water					

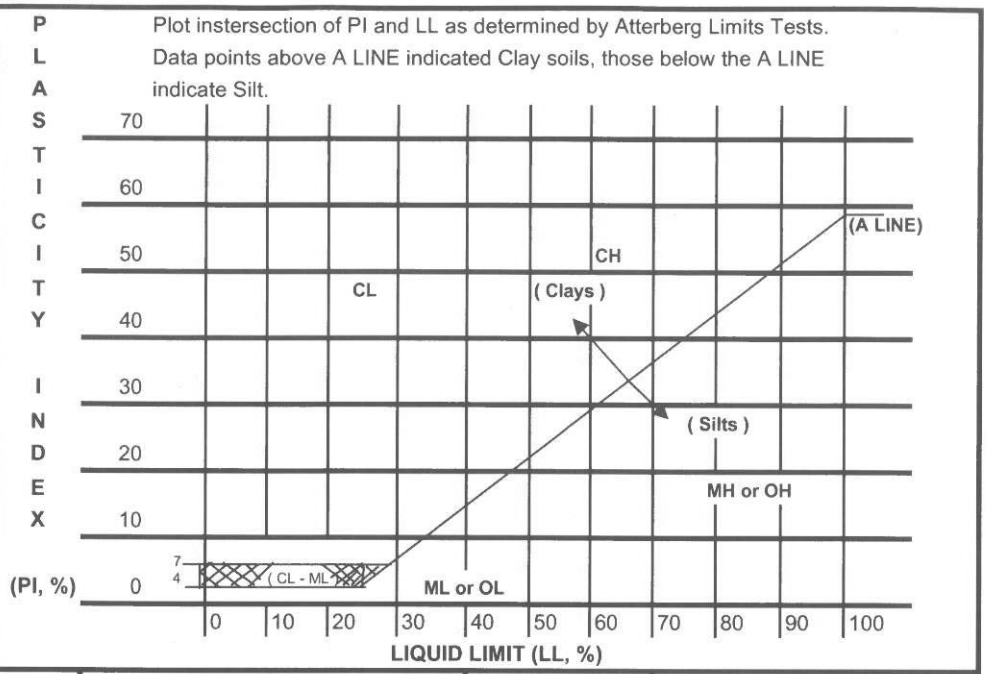
*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

United Soil Classification System
ASTM Designation D - 2487

psi Information To Build On
Engineering • Consulting • Testing

Based upon percentage of material passing No. 200 sieve classify as:

Less than 5%	GW, GP, SW, SP
More than 12%	GM, GC, SM, SC
5% to 12%	Borderline, use dual symbols



Coarse Grained Soils (More than half of is larger than No. 200 sieve)	Gravels (More than 50% retained on No.4 sieve)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 4$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} * D_{60}} < 3$
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Does not meet all requirements for GW	
		GM	Silty gravels, gravel-sand-silt mixtures	below A Line, PI < 4	in shaded area 4 < PI < 7 Dual Symbols
		GC	Clayey gravels, gravel-sand-clay mixtures	above A Line, PI > 7	
	Sands (More than 50% passing a No. 4 sieve)	SW	Well graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 6$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} * D_{60}} < 3$
		SP	Poorly graded sands, gravelly sands, little or no fines	Does not meet all requirements for SW	
		SM	Silty sands, sand-silt mixtures	below A Line, PI < 4	in shaded area 4 < PI < 7 Dual Symbols
		SC	Clayey sands, sand-clay mixtures	above A Line, PI > 7	
Fine Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts & Clays (LL less than 50)	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		OL	Organic silts and organic silty clays of low plasticity		
	Silts & Clays (LL greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts		
		CH	Inorganic clays of high plasticity fat clays		
		OH	Organic clays of medium to high plasticity		
	Highly Organic Soil	Pt	Peat and other highly organic soils		

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIONLESS SOILS

(Silt, Sand, Gravel and Combinations)

Density

Very Loose	5 blows per foot or less
Loose	6 - 10 blows per foot
Medium Dense	11 - 30 blows per foot
Dense	31 - 50 blows per foot
Very Dense	51 blows per foot or more

Relative Properties

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

Particle Size Indentification

Boulders	8 inch diameter or more	
Cobbles	3 - 8 inch diameter	
Gravel	Coarse	1 - 3 inches
	Medium	1/2 - 1 inch
	Fine	1/4 - 1/2 inch
Sand	Coarse	0.6 mm - 1/4 inch (diameter of pencil lead)
	Medium	0.2 mm - 0.6 mm (diameter of broom straw)
	Fine	0.05 mm - 0.2 mm (diameter of human hair)
Silt		0.002 mm - 0.05 mm (cannot see particles)

COHESIVE SOILS

(Clay, Silt and Combinations)

Consistency

Very soft	3 blows per foot or less
Soft	4 - 5 blows per foot
Medim Stiff	6 - 10 blows per foot
Stiff	11 - 15 blows per foot
Very Stiff	16 - 30 blows per foot
Hard	31 blows per foot or more

Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to very high	over 22

CLASSIFICATION ON LOGS ARE MADE BY VISUAL EXAMINATION OF SAMPLES.

Standard Penetration Test — Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary for ITL to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The quantity of hammer blows for seating the sampler and performing the test are recorded for each 6.0 inches of penetration on the Field Exploration Log (example: 6-10-13). The standard penetration test result can be obtained by adding the last two figures (i.e. 10 + 13 = 23). The reader is referenced to ASTM D1586.

Strata Changes — Boundaries between soil layers are considered approximate based upon observed changes during the drilling operations or noted changes within representative samples.

Groundwater — Observations were made to determine either the depth or elevation of water at the times indicated on the Soil Exploration Logs. The water so encountered may be groundwater or perched water. The depth or elevations indicated for water may fluctuate due to seasonal changes or other unknown factors.

Information To Build On
Engineering • Consulting • Testing

May 14, 2014

Homer Central School District
PO Box 500
80 South West Road
Homer, New York 13077
Attn.: Ms. Nancy Ruscio, Superintendent

Subject: **Geotechnical Engineering Services Report**
Homer Central School District
Proposed Homer Senior High School Additions
Music Room Addition and Gymnasium Addition
80 South West Street
Homer, Cortland County, New York 13077
PSI Project No.: 0806572

Dear Ms. Ruscio:

Thank you for choosing Professional Service Industries Engineering, PLLC (PSIE, PLLC) as your consultant for the above referenced project.

Per your authorization, Professional Service Industries Engineering, PLLC has completed a Geotechnical Engineering Study for the above referenced project. The results of the study are discussed in the accompanying report. An electronic PDF copy has previously been emailed.

It is considered imperative that the geotechnical engineer and/or their representative be present during earthwork operations, foundation and floor slab installations to observe the field conditions with respect to the design assumptions and specifications. PSI will not be held responsible for interpretations and field quality control observations made by others.

Should there be any questions, please do not hesitate to contact our office at (716) 694-8657. Professional Service Industries Engineering, PLLC would be pleased to continue providing geotechnical services throughout the implementation of the project, and we look forward to working with you and your organization on this and future projects.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES ENGINEERING, PLLC

Steven Pump	David B. Sabol, PE	Paul S. Hundley for Steven Pump
Branch Manager	Senior Vice President	Principal Consultant

GEOTECHNICAL ENGINEERING SERVICES REPORT

For the proposed

HOMER CENTRAL SCHOOL DISTRICT
PROPOSED HOMER SENIOR HIGH SCHOOL ADDITIONS
MUSIC ROOM AND GYMNASIUM ADDITIONS
80 SOUTH WEST STREET
HOMER, CORTLAND COUNTY, NY 13077

Steven Pump

Steven Pump
Branch Manager

Prepared for

Homer Central School District
PO Box 500
80 South West Road
Homer, New York 13077

Steven Pump for

Paul Hundley
Principal Consultant

Prepared by

Professional Service Industries Engineering, PLLC
3784 Commerce Court, Suite 300
North Tonawanda, New York 14120
Telephone (716) 694-8657
Fax (716) 694-8638

David B. Sabol, P.E.
Senior Vice President

PSIE, PLLC PROJECT NO.: 0806572

May 14, 2014

[psi]

TABLE OF CONTENTS

1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

Professional Service Industries Engineering, PLLC (PSIE, PLLC) has completed a geotechnical engineering exploration for the Homer Senior High School Proposed Music Room Addition and Gymnasium Addition located at 80 South West Street in Homer, Cortland County, New York. Written authorization to proceed with this geotechnical engineering evaluation and analysis was provided by Ms. Nancy S. Ruscio, Superintendent with the Homer Central School District in the form of a signed copy of PSI Proposal No. 0806-115453 by Ms. Nancy S. Ruscio on March 11, 2014. PSIE, PLLC's services for this project were performed in accordance with PSI Proposal No. 0806-115453, dated February 7, 2014.

1.2 PROJECT DESCRIPTION

Project information was obtained from Ms. Kristi L. Rathbun, Structural Engineer, with Hunt, Engineers, Architects & Land Surveyors, P.C.

The following drawings were provided to develop the scope of work:

- One (1) Hunt Engineers, Architects & Surveyors, PC project drawing dated February 2014, numbered SB-1 and titled "High School Soil Boring Location Plan" containing approximate soil boring locations, the proposed building addition footprints, and existing building footprint.

The project site is located at 80 South West Street in Homer, Cortland County, New York. It is understood that the project is going to consist of the construction of two additions to the existing Homer Senior High School. The western building addition will be the Music Room addition and will be two-stories. The eastern building addition will be the Gymnasium addition and will be two-stories. Both of the additions are expected to have a finished floor elevation equal to the original building elevation.

Construction of the additions is anticipated to be a steel frame system consisting of metal roof deck supported by steel joists on steel perimeter beams and columns. The floor slab is anticipated to be a concrete slab on grade with typical spread foundations supporting the walls and columns. Structural loadings as provided by Hunt Engineers, Architects & Surveyors, PC are as follows:

Columns Loads (Music Addition): Forty (40) to eighty (80.0) kips (k)
Columns Loads (Gym Addition): One-hundred (100) to one-hundred sixty (160) kips (k)

At this time, final grading plans were not provided. Therefore, this report is based upon the proposed building footprint and parking area final grades relatively following the existing site topography. It is estimated that the proposed building footprint will require earthwork operations consisting of less than two (2) feet of cut and fill to achieve final grades after removal of the topsoil. If the final grading plans are known, we request to

be retained to review the grading plans and submit supplemental recommendations based on these plans, if appropriate.

The information presented in this section was used in our evaluation. Estimated loads and corresponding foundation sizes have a direct affect on the recommendations, including the type of foundation, the allowable bearing pressure, and the estimated settlement. In addition, estimated subgrade elevations and cut/fill amounts can have a direct affect on the provided recommendations. If any of the noted information has changed or additional information becomes available, PSIE, PLLC should be notified so that we may amend the recommendations presented in this report, if appropriate.

1.3 PURPOSE AND SCOPE OF WORK

1.3.1 FIELD EXPLORATION

The purpose of this study was to evaluate the subsurface conditions at the site and to develop geotechnical related foundation, slab-on-grade, and fill recommendations. PSIE, PLLC's scope of services included site reconnaissance of the project area, a review of geologic maps of the area, and drilling three (3) test borings to boring termination depths ranging from twenty-five (25) to thirty (30) feet below the existing ground surface. The borings were advanced into the ground using hollow stem augers. At regular intervals throughout the boring depths, soil samples were obtained with a split spoon sampler. The split spoon sampler was first seated six (6) inches to penetrate any loose cuttings and then driven an additional foot, where possible, with blows of a one hundred forty (140) pound hammer falling thirty (30) inches. The number of hammer blows required to drive the sampler each six-inch increment is recorded in the field. The penetration resistance "N value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during this exploration are in basic accordance with ASTM Designation D-1586.

Ms. Kristi L. Rathbun, Structural Engineer, with Hunt, Engineers, Architects & Land Surveyors, P.C. selected the borings' locations and Professional Service Industries Engineering, PLLC selected the borings' depths. The borings were located in the field by a representative of PSIE, PLLC by measuring distances from known reference points. Top-of-hole elevations were not determined or provided for this report. Following completion of the field services, the recovered soil samples were returned to PSIE, PLLC's office for review, evaluation, and laboratory testing. The results of PSIE, PLLC's subsurface exploration and soil sample documentation and testing are presented herein together with geotechnical recommendations for site preparation and building foundation support.

As directed by the client, PSIE, PLLC did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is

ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSIE, PLLC's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSIE, PLLC cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

The scope of services also does not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

1.3.2 LABORATORY TESTING

The samples obtained during the drilling operation were placed in sealed and labeled containers and transported to our North Tonawanda, New York laboratory. The soil samples obtained from the drilling operation were classified in general accordance with ASTM D-2488 (Visual-Manual Procedure for Description of Soils). Soil classifications include the use of the Unified Soil Classification System described in ASTM D-2487 (Classification of Soils for Engineering Purposes). Water content determinations (ASTM D-2211) were also conducted. Descriptions of the soils encountered in the test boring are provided on the Boring Records included in the Appendix. Groundwater conditions, Standard Penetration Resistances and other pertinent information are also included. The soil samples that were not altered by laboratory testing will be retained at our office for sixty (60) days from the date of this report and then discarded.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 SITE LOCATION AND DESCRIPTION

The project site is located at 80 South West Street in Homer, Cortland County, New York. Primary access to the property is from either South West Street to the west or Center Street to the north. The Boring Location Plan in the Appendix indicates the location of the proposed building additions with respect to South West Street to the west. At the time of the drilling operations, the site contained the existing Homer Senior High School. The existing building is a three-story structure that was built around 1950. The construction of the building structure is a concrete slab on metal deck floor system supported by steel joists, beams, and columns. The foundations for the building are a shallow foundation utilizing spread and strip footings. There were two (2), two to three-story additions to the original structure built in 1960 and 2003. Construction type for the 1960 addition is similar to the original construction.

Image obtained from Bing Maps ™

Based on visual observations of the site by a Professional Service Industries Engineering, PLLC engineer, the proposed building addition(s) footprint(s) appear to have elevation differences of less than two (2) feet. At the time of drilling operations and boring layout, no catch basins, ponded water surfaces or drainage ditches were observed within the proposed project area. During the field operations, the truck-mounted drill rig experienced some difficulty accessing and traversing the site surface and boring locations due to the wet/loose/soft surficial soils.

2.2 SUBSURFACE CONDITIONS

2.2.1 LOCAL GEOLOGY

The project area within the Homer, Cortland County, New York region is located within the glaciated portion of the Appalachian Uplands physiographic province. As noted on the 1988 "Surficial Geologic Map of New York", surface soils in the area generally consist of outwash sand and gravel (coarse to fine gravel with sand, proglacial fluvial deposition, well-rounded and stratified). Bedrock in the general site area is part of the Paleozoic upper Devonian age Genesee Group and Tully Limestone, which consists of West River Shale, Genundewa Limestone, Penn Yan and Geneseo Shale, all except Geneseo replaced eastwardly by the Ithaca Formation (shale, siltstone, Sherburne siltstone). Glacial imprints dominate the landscapes of central New York. Only small areas remain of the prior landforms that existed prior to the Pleistocene glaciation. Post-glacial processes have reshaped the flood plains and valley walls. In areas of steep slope, a cover of drift generally mantles the bedrock.

2.2.2 TEST BORINGS

PSIE, PLLC performed three (3) test borings at the site. These borings were drilled on April 23, 2014. Ms. Kristi L. Rathbun, Structural Engineer, with Hunt, Engineers, Architects & Land Surveyors, P.C. selected the borings' locations and Professional Service Industries Engineering, PLLC selected the borings' depths. Top-of-hole elevations were not determined or provided for this report. Professional Service Industries Engineering, PLLC notified Dig Safely New York for public utility clearance, prior to drilling the site.

The borings were advanced with hollow stem augers to boring termination depths ranging from twenty-five (25) to thirty (30) feet below the existing ground surface. For each boring, Standard Penetration Tests (SPT's) were performed and split spoon samples were obtained at regular intervals to the boring termination depth. The split spoon sampling procedures used during this exploration are in basic accordance with ASTM Designation D-1586. The soil samples will be stored in our laboratory for further analysis, if requested. Unless notified otherwise, the samples will be disposed of after six (6) months.

The soil types encountered at the specific boring locations (see Boring Location Diagram) are presented in the form of individual soil profiles on the attached Boring Logs. The stratification presented is based on visual examination of the recovered soil samples and

the interpretation of field logs by a geotechnical professional. Included on the profiles are the Standard Penetration Test values (N-values) for the borings. The N-values have been empirically correlated with various soil properties and are considered to be indicative of the relative density of cohesionless soils and the consistency of cohesive soils. A brief description of the soils encountered at this site is presented in this section.

The following subsurface description is of a generalized nature and intended to highlight the major subsurface stratification features and material characteristics. Professional Service Industries Engineering, PLLC was not provided with existing topographic information; therefore, ground surface elevations are not presented on the boring logs or referenced in this report. PSIE, PLLC recommends that the boring positions be established by a licensed surveyor. The Boring Logs illustrated in the Appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, penetration resistances, locations of the samples and laboratory test data. The stratifications shown on the Boring Logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual.

TOPSOIL: At the surface at all the boring locations, approximately eight (8) inches of topsoil were encountered. The topsoil thickness should be expected to vary across the site.

GRANULAR SOILS*:* Underlying the topsoil at all the boring locations, granular soils of various textures extended to approximate boring termination depths ranging from twenty-five (25) to thirty (30) feet below existing site grades. The granular soils were generally classified as SILT (ML), SANDY SILT (ML), SILTY SAND (SM), and/or POORLY GRADED SAND (SP). Standard Penetration resistances (N-values) for the granular soils ranged from six (6) to fifty-one (51) blows per foot, indicating loose to very dense relative densities. However, because of cobbles and boulders encountered in the soil profile, N-values in the granular soils may not be indicative of the actual relative density. Moisture contents of selected samples of the strata ranged from three (3) to thirty-one (31) percent.

2.3 GROUNDWATER CONDITIONS

At the time of the site fieldwork on April 23, 2014, the following table illustrates the infiltrating groundwater levels encountered at the test boring locations prior to auger removal during the field drilling operations:

Table 1: Groundwater Levels (As Measured Beneath the Existing Site Grade)

Boring Number	Groundwater Levels		Borehole Cave Depth
	During Drilling Activities	At Completion of Drilling Activities	
	(feet)	(feet)	(feet)
B-1	13.5	None	11.5
B-2	20.0	None	9.0
B-3	23.0	None	6.0

For safety purposes, all test borings were backfilled at the time of drilling completion.

These observations represent the groundwater conditions at the time of measurement and may not be indicative of other times. However, **discontinuous zones of perched water will exist within the shallower overburden materials** and the builder should anticipate surface and subsurface seepage into any subsurface excavations during high moisture periods of the year. Variations in groundwater levels should be expected seasonally, annually, and from location to location.

3.0 OBSERVATIONS AND EVALUATIONS

3.1 GENERAL

The following geotechnical design recommendations have been developed on the basis of the previously described project characteristics and encountered subsurface conditions. If there are any changes in these project criteria, including building location on the site of final floor elevations, a review should be made by Professional Service Industries Engineering, PLLC's to determine if modifications to the recommendations are necessary.

Once final design plans and specifications are available, a general review by PSIE, PLLC is recommended as a means to check that the evaluations made in preparation of this report are consistent with final construction plans and that earthwork and foundation recommendations are properly interpreted and implemented.

Based on the results of Professional Service Industries Engineering, PLLC's fieldwork, laboratory testing, and engineering analyses, the site appears suitable for the proposed structure and associated improvements provided the following recommendations are incorporated into the design and construction of the project. The primary geotechnical considerations for the development of these sites will be the previous site development, the possible superimposition of foundation stresses where new footings for the addition are to be situated within a distance of 2B (B = footing width) from the edge of the footings of the existing foundation members, in the vicinity of boring locations SB-1 and SB-2 loose and/or wet soils may be encountered in the bottom of footing excavations, and the moisture susceptibility of the on-site soils.

In the vicinity of boring locations SB-1 and SB-2, the bottom of footing excavation will probably be loose and/or wet and will require to be undercut and replaced with coarse aggregate such as NYSDOT 304 crushed stone and/or choked with coarse aggregate such as a NYSDOT #4 stone prior to reinforcement and Portland cement concrete placement. The lateral limits of the undercut/over-excavation should be defined by a line drawn outward and downward at 1H:2V from the perimeter of the foundation bearing area. It must be recognized that field conditions will dictate the extent of the undercut.

It must be recognized that soils that contain silt and clay are difficult to dry during wet or cool season. Careful attention to moisture content and compactive effort is important in dealing with such soils. The soils may need to be scarified and dried to a moisture content that will facilitate compaction in accordance with the structural fill requirements of this report. **Portland cement stabilization for silty soils (a fly ash / lime / kilndust for cohesive soils) may be necessary in order to expedite the work and achieve the required level of soil compaction**.

With the previous mentioned considerations in mind, it is Professional Service Industries Engineering, PLLC's opinion that the proposed building additions can be supported on shallow spread-type footings bearing on the existing natural soils and/or engineered fill. The building interior floors can be constructed on properly prepared

subgrades following proofroll/proof-compaction acceptance of existing natural soil subgrade and/or engineered fill.

3.2 SITE PREPARATION

Unless specifically indicated otherwise in the drawings and/or specifications, the limits of this subsurface preparation are considered to be that portion directly beneath and ten (10) feet beyond the building and appurtenances. Appurtenances are those items attached to the building and typically include, but are not limited to, the building sidewalks, porches, stoops, etc.

Site preparation should commence with the removal of the existing pavements (Music Addition footprint only), sidewalks, vegetation/grass/topsoil and any deleterious materials. The geotechnical engineer of record or his representative should determine the depth of removal at the time of construction. Underground storage tanks, abandoned utilities, old foundations or other features not evident at the time of Professional Service Industries Engineering, PLLC's investigation should also be removed. Professional Service Industries Engineering, PLLC recommends that all topsoil and loose and wet or deleterious soils in the construction areas be stripped from the site and either wasted or stockpiled for later use in landscaping. The geotechnical engineer of record or his representative should determine the depth of removal at the time of construction.

After removal of the existing pavements, sidewalks, grass/topsoil/vegetation, loose and wet soils and other deleterious materials, the exposed undercut areas should be brought back up to proposed grades with compacted engineered fill. Prior to placement of the engineered fill, the geotechnical engineer of record or his representative should observe the subgrade condition. Fill material and compaction requirements are discussed in more detail in the following paragraphs.

PSIE, PLLC has not been provided with any final grading plans and we do not know at this time how surface elevations will change at the time of construction. Additional site preparation will depend upon the proposed site grades and building features. Prior to the beginning of fill placement activities, PSIE, PLLC recommends that all areas receiving new fill be proof-compacted. Proof-compaction operations should be performed using a minimum fifteen (15) ton smooth drum vibratory roller, operating in the vibratory mode. Proof-compaction operations should be observed by the geotechnical engineer of record or his representative and should continue until a firm and unyielding condition exists (typically less than three-quarters inch ruts). Unstable soils which are revealed by proof-compaction and which cannot be adequately densified in place should be removed and replaced with crushed limestone (NYSDOT 304) or choked with coarse aggregate such as NYSDOT No. 4 stone under the recommendations of the geotechnical engineer of record or his representative. Additionally, depending on weather conditions and precipitation at the time of construction, the use of additional stabilization techniques such as choking the subgrade with coarse aggregate may be required in the upper eighteen (18) inches of the exposed subgrade. Field conditions will dictate the extent of any undercuts.

During the site area grading, zones of perched groundwater may be encountered. Local undercutting and pumping to remove water may be required when such zones are encountered, and provisions should be made in this regard by the builder.

After subgrade preparation and observation have been completed, fill placement may begin. The first layer of fill material should be placed in a relatively uniform horizontal lift and be adequately keyed into the stripped subgrade soils.

During site preparation, filled sidewalk vaults, burn pits, old foundations, trash pits or other isolated disposal areas may be encountered. All too frequently such buried material occurs in isolated areas outside boring locations. Any such material encountered during site work or foundation construction should be excavated and removed from the site.

3.3 FILL MATERIAL AND PLACEMENT

After the performance of grubbing and clearing operations and cutting to design subgrade, PSIE, PLLC recommends that proof-compaction operations should be performed using a 10 to 15-ton (static weight) smooth drum vibratory roller. Proof-compaction operations should be observed by a representative of PSIE, PLLC and should continue until a firm and unyielding condition exists (typically less than three-quarters inch ruts). Unstable soils which are revealed by proof-compaction and which cannot be adequately densified in-place should be removed and replaced with structural fill.

Materials placed as fill should meet the requirements of structural fill as provided in this section. It is also recommended that PSIE, PLLC be retained to perform field density testing during fill placement.

Subgrade areas should be kept properly drained and free of ponded water surfaces. This may be achieved by sloping the exposed pad so that storm water can flow off the pad.

The on-site natural soils can be considered for reuse as structural fill, as long as the soils are placed within an acceptable moisture condition, and free of organic or other deleterious materials. It must be recognized that soils that contain silt and clay are difficult to dry during wet or cool season. Careful attention to moisture content and compactive effort are important in dealing with such soils and it is typical for wet or cool season grading operations to be hindered by the continual need to dry back silty and clayey soils during placement. It is advantageous to place a working course of compacted graded aggregate base over building and roadway areas between the time of initial grading and final floor slab construction. The graded aggregate base may need periodic replenishment depending on weather and traffic conditions during construction.

On-site or imported structural fill materials should be free of organic or other deleterious materials. If grading results in a need for additional fill materials, the imported structural fill should have a maximum particle size less than three (3) inches, a modified Proctor maximum dry density greater than one hundred ten (110) pounds per cubic foot (pcf) and

less than twenty (20) percent passing the No. 200 sieve. Structural fill should consist of non-expansive materials and not contain more than three (3) percent (by weight) of organic matter or other detrimental material. Typically the Plasticity Index (PI) for the material should not exceed fifteen (15), and the Liquid Limit (LL) for the material should not exceed forty (40) (Unified Soil Classifications of GW, GM, GC, GP, SW, SM, SP, SC), unless otherwise allowed by the geotechnical engineer.

It must be recognized that soils that contain silt and clay are difficult to dry during wet or cool season. Careful attention to moisture content and compactive effort is important in dealing with such soils. The soils may need to be scarified and dried to a moisture content that will facilitate compaction in accordance with the structural fill requirements of this report. **Portland cement stabilization for silty soils (a fly ash/ lime / kilndust for cohesive soils) may be necessary in order to expedite the work and achieve the required level of soil compaction.**

If the structural fill for the site is imported, the geotechnical engineer should test and report on the proposed imported fill prior to purchase and delivery. Based upon the topography and location of the site, imported fill will probably be required. Fine-grained soils and the on-site soils used for fill require close moisture content control to achieve the recommended degree of compaction and are not recommended for use during wet weather construction. Structural fill soils should be moisture conditioned to between two (2) percent below and two (2) percent above optimum moisture content and placed in maximum eight (8)-inch lifts in the excavation. Structural fill should be compacted to at least ninety-five (95) percent of the maximum density as determined by the Modified Proctor Test (ASTM D-1557). Each lift of compacted fill should be tested for density by a representative of the geotechnical engineer prior to placement of subsequent lifts. If fill placement must proceed during other than the summer months, the use of imported granular fill with less than ten (10) percent passing the No. 200 sieve may be necessary.

3.4 FOUNDATION RECOMMENDATIONS

Based on the findings at the boring locations during our geotechnical exploration, it is PSIE, PLLC's opinion that the proposed structure can be supported on shallow spread-type footings bearing on the existing natural soils and/or engineered fill.

After the site has been prepared as described in "*Site Preparation*" Section above, the proposed structure may be supported on shallow spread footings bearing on the natural soils, weathered shale, and/or the new, compacted structural fill. Spread footings for building columns and continuous footings for bearing walls can then be designed for a **maximum allowable soil bearing pressure of 2,000 psf,** when founded on the existing natural soils and/or engineered fill. The allowable bearing pressure is based on a minimum safety factor of 3.0 and is intended for dead loads and sustained live loads. The bottom of the footing excavations should be observed and the surface compacted with either a vibratory or an impact compactor weighing at least two hundred (200) pounds and imparting a minimum of four (4) kips of force to the subgrade. In the vicinity of boring locations SB-1 and SB-2, the bottom of footing excavation will probably be loose and/or wet and will require to be undercut and replaced with NYSDOT 304 Type 2 crushed stone

and/or choked with coarse aggregate such as a NYSDOT #4 stone prior to engineered fill placement, reinforcement and Portland cement concrete placement. Field conditions will dictate the extent of the undercut and replacement. Should the footing excavation need to be undercut, a line drawn outward and downward at 1H:2V from the perimeter of the foundation bearing area should define the lateral limits of over-excavation.

Continuous wall and isolated column footings should be at least eighteen (18) and thirty (30) inches in width, respectively. Column and wall footings should extend to a minimum depth of forty-eight (48) inches beneath the lowest adjacent exterior grade to provide adequate frost protection. In heated areas, interior footings can be located at a minimum depth of eighteen (18) inches below finished floor elevations. The size of the foundation, the bearing pressure and the embedment depth has a direct impact on the anticipated settlement. If the design varies from the above recommendations, PSIE, PLLC should review the design to check for the potential for excessive settlement.

Adjacent to any existing basement wall, the new footing should be stepped down to match the bearing elevation of the existing footing. The new footing should not bear on existing basement wall backfill. The footings should be stepped down in maximum height two (2)-foot steps at a maximum average of 2H:1V. Furthermore, where new footings for the proposed additions are situated within a distance of 2B (B=footing width) from the edge of the footings of the existing foundation members, the new footing's bearing elevations should match the existing footing's bearing elevations. The addition should be structurally separated from the existing building and expansion joints provided. Foundations move or settle proportional to the amount of the load that they transfer to the underlying bearing soils. Where foundations are located in close horizontal and vertical proximity of each other, the foundation load will superimpose on the soils actually carrying those applied loads. The superimposed loads will tend to cause an existing foundation to settle more because the soil under the footing is carrying more load. The superimposed loads will also cause the new foundation to settle more than an isolated footing because the soil is carrying the load of the existing foundation prior to the new foundation placement. Therefore, PSIE, PLLC recommends that when the final design is completed, the geotechnical engineer of record should review the alignment of the new and existing foundation.

The foundation walls may not be free standing in the overburden soils; therefore the sides of the cut excavation for the footings may need to be sloped and the footings formed and backfilled in order to maintain a vertical concrete face.

Footing soils need to be observed and documented and concrete placed as quickly as possible to avoid exposure of the bottom of footing soils to disturbance due to construction traffic, drying or water accumulation. If concrete will not be placed the same day a foundation excavation is cut to grade, the contractor should be required to place three (3) to five (5) inches of compacted crushed aggregate within the footing excavation. The foundation excavations should be observed by a representative of PSIE, PLLC prior to steel or concrete placement to document that the foundation materials are consistent with the report.

Once the footing concrete is placed, the foundations should be backfilled with structural fill as soon as it is safe to do so without causing damage to them. The backfill serves to protect the footing, is a component of overturning resistance and prevents accumulation of water around the foundations which can soften and weaken the bearing soils. The ground surface near the completed foundations should be sloped to drain away from the foundations throughout construction to avoid accumulation of moisture in the subgrade soils.

The foundation excavations should be observed by the geotechnical engineer of record or his representative prior to steel or concrete placement to document that the foundation materials are consistent with the report.

3.5 SETTLEMENT

The settlement of shallow foundations supported on engineered fill or suitable natural soils are anticipated to be measurable, but tolerable for the type of construction proposed. PSIE, PLLC estimates that foundations designed and constructed in accordance with the above recommendations will experience estimated total settlements generally less than one (1)-inch with differential settlement generally less than a half (3/4)-inch. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the structural engineer should confirm the tolerance of the proposed structure to the predicted total and differential settlements. While settlement of this magnitude is generally considered tolerable for the proposed construction, the design of building walls must include provisions for additional reinforcing steel and liberally spaced vertical control joints to limit the affects of cosmetic cracking.

3.6 SEISMIC DESIGN

The 2010 New York State Building Code is an adaptation of the 2006 International Building Code (IBC). As part of this code, the design of structures must consider dynamic forces resulting from seismic events. These forces are dependent upon the magnitude of the earthquake event as well as the properties of the soils that underlie the site.

Part of the IBC code procedure to evaluate seismic forces, requires the evaluation of the Seismic Site Class, which categorizes the site based upon the characteristics of the subsurface profile within the upper one hundred (100) feet BGS. To define the Seismic Site Class for this project, Professional Service Industries Engineering, PLLC has interpreted the results of the soil test borings drilled within the project site and estimated appropriate soil properties below the base of the borings to a depth of one (100) feet, as permitted by Section 1615.1.1 of the code. The estimated soil properties were based upon data available in published regional geologic reports as well as Professional Service Industries Engineering, PLLC's experience with subsurface conditions in the general site area. PSIE, PLLC anticipates that the subsurface conditions below the explored depth may generally consist of outwash sand and gravel overlying shale and/or limestone. Based on the review of the available data, knowledge of regional geology and the Standard Penetration Test (SPT) N values, we have

assigned a **Soil Site Class D** as defined in Section 1615.1.1. The recommended seismic vales are presented in Table 2, Recommended Seismic Values.

The USGS-NEHRP probabilistic ground motion values for the site which were obtained from the USGS geohazards web page (http://eqdesign.cr.usgs.gov/html/design-lookup.html) and are as follows:

Table 2: Recommended Seismic Values

Parameter	NY Building Code Reference	Value
Site Class	Table 1615.1.1	D
Mapped spectral accelerations for short periods (S_S)	Figure 1615(1)	0.166 g
Mapped spectral accelerations for a 1-second period (S_1)	Figure 1615(2)	0.058 g
Site coefficient F_a	Table 1615.1.2(1)	1.6
Site coefficient F_V	Table 1615.1.2(2)	2.4
Maximum considered earthquake spectral response for short periods (S_{MS}) adjusted for site class effects	Equation 16-38	0.266 g
Maximum considered earthquake spectral response for 1-second period (S_{M1}), adjusted for site class effects	Equation 16-39	0.139 g
Design Spectral Response acceleration at short periods (S_{DS})	Equation 16-40	0.177 g
Design Spectral Response acceleration at 1-second periods (S_{D1})	Equation 16-41	0.093 g

NOTES: *Based upon a 2% Probability of Exceedence in 50 years
MCE = Maximum Considered Earthquake
g = acceleration due to gravity

The Site Coefficients, Fa and Fv presented in the above table were interpolated from IBC Tables 1613.5.3(1) and 1613.5.3(2) as a function of the site classification and mapped spectral response acceleration at the short (S_s) and 1 second (S_1) periods.

A **Seismic Design Category C** was assigned as determined for the intended building use (Type IV) and the IBC Tables 1613.5.6(1) and 1613.5.6(2). For such a Design Category, the code requires an assessment of slope stability, liquefaction potential and surface rupture due to faulting or lateral spreading. Detailed evaluations of these factors were beyond the scope of this study. However, the following table presents a qualitative assessment of these issues considering the site class, the subsurface soil properties, the groundwater elevation, and probabilistic ground motions:

Hazard	Relative Risk	Comments
Liquefaction	Moderate	The groundwater is at an depth of approximately 13.5 to 23.0 feet below grade and the subsurface profile within the upper 30 feet of the ground surface contains very loose to medium dense cohessionless materials.
Slope Stability	Low	The site will not incorporate any significant cut/fill slopes and the probabilistic ground accelerations are low which should not significantly affect the stability of the anticipated slopes at the site.
Surface Rupture	Moderate	The materials beneath the site have a risk to liquefaction and associated lateral spreading.

As noted in the previous table, the site possesses a moderate risk of liquefaction. In order to more accurately define and mitigate this risk, additional field exploration, possible laboratory testing and analyses will be required. In addition, a Refraction Microtremor (ReMi) study of the site to better define the shear wave velocity profile and weighted shear wave velocity for the upper one hundred (100) feet of the subsurface profile can be performed at an additional cost

3.7 FLOOR SLAB RECOMMENDATIONS

The proposed building slab-on-grade may be supported on natural soils and/or compacted engineered fill placed over a suitable natural soil subgrade, provided the upper soils have been proof-compacted with a minimum fifteen (15) ton smooth drum, vibratory roller, operating in the vibratory mode in order to confirm their suitability. Any observed soft or otherwise unsuitable areas should be over-excavated down to firm subgrade and replaced with compacted-engineered fill.

For the subgrade prepared as recommended and properly compacted fill, a modulus of subgrade reaction, *k* value, of 110 pounds per cubic inch (pci) may be used in the grade slab design based on a one (1) foot by one (1) foot plate load test. However, depending on how the slab load is applied, the value will have to be geometrically modified. The value should be adjusted for larger areas using the following expression for cohessionless soil:

Modulus of Subgrade Reaction, $k_s = k \left(\frac{B+1}{2B} \right)^2$ for cohessionless soil

where: k_s = coefficient of vertical subgrade reaction for loaded area,
k = coefficient of vertical subgrade reaction for 1 x 1 square foot area,
B = width of area loaded, in feet.

In order to provide uniform subgrade reaction beneath any proposed floor slab-on-grade, we recommend that floor slabs be underlain by a minimum of six (6) inches of free-draining compactible, trimmable (a maximum particle size of three-quarters (¾) inch with

less than five (5) percent material passing the no. 200 sieve), well-graded gravel or crushed rock base course. Base course material should be moisture conditioned to within +/- two (2) percent of optimum moisture content and compacted by mechanical means to a minimum of ninety-five (95) percent of the material's maximum dry density as determined in accordance with ASTM D 1557 (Modified Proctor).

The crushed stone should provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired, a vapor retarding membrane may also be incorporated into the design. Factors such as cost, special considerations for construction, and the floor coverings suggest that the architect and owner make decisions on the use of vapor retarding membranes.

The precautions listed below should be followed for construction of slabs-on-grade pads. These details will not reduce the amount of movement, but are intended to reduce potential damage should some settlement of the supporting subgrade take place. Some increase in moisture content is inevitable because of development and associated landscaping. However, extreme moisture content increases can be largely controlled by proper and responsible site drainage, building maintenance and irrigation practices.

- Cracking of slabs-on-grade is normal and should be expected. Cracking can occur because of not only heaving or compression of the supporting soil and/or bedrock material, but also as a result of concrete curing stresses. The occurrence of concrete shrinkage cracks, and problems associated with concrete curing may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement, finishing, and curing, and by the placement of crack control joints at frequent intervals, particularly, where re-entrant slab corners occur. The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions. For example, joints are recommended at a maximum spacing of twelve (12) feet assuming a four-inch thick slab. PSIE, PLLC also recommends that the slab be independent of the foundation walls. Using fiber reinforcement in the concrete can also control shrinkage cracking.

- Areas supporting slabs should be properly moisture conditioned and compacted. Backfill in all interior and exterior water and sewer line trenches should be carefully compacted.

- Exterior slabs should be isolated from the building. These slabs should be reinforced to function as independent units. Movement of these slabs should not be transmitted to the building foundation or superstructure.

3.8 UTILITIES TRENCHING

Excavation for utility trenches shall be performed in accordance with OSHA regulations as stated in 29 CFR Part 1926. It should be noted that utility trench excavations have the potential to degrade the properties of the adjacent fill materials. Utility trench walls that are allowed to move laterally can lead to reduced bearing capacity and increased

settlement of adjacent structural elements and overlying slabs.

Backfill for utility trenches is as important as the original subgrade preparation or structural fill placed to support either a foundation or slab. Therefore, it is imperative that the backfill for utility trenches be placed to meet the project specifications for the structural fill of this project. In areas that are not accessible to construction personnel and standard compaction equipment, PSIE, PLLC recommends that flowable fill or lean mix concrete be utilized for utility trench backfill. If on-site soils are placed as trench backfill, the backfill for the utility trenches should be placed in four (4) to six (6) inch loose lifts and compacted to a minimum of ninety-five (95) percent of the maximum dry density achieved by the modified Proctor test.

The backfill soil should be moisture conditioned to be within two (2) of the optimum moisture content as determined by the modified Proctor test. Up to four (4) inches of bedding material placed directly under the pipes or conduits placed in the utility trench can be compacted to the ninety (90) percent compaction criteria with respect to the modified Proctor (ASTM D-1557). Compaction testing should be performed for every two hundred (200) cubic yards of backfill placed or each lift within two hundred (200) linear feet of trench, whichever is less. Backfill of utility trenches should not be performed with water standing in the trench. If granular material is used for the backfill of the utility trench, the granular material should have a gradation that will filter protect the backfill material from the adjacent soils.

If material having this gradation is not available, a geosynthetic non-woven filter fabric should be used to reduce the potential for the migration of fines into the backfill material. Granular backfill material shall be compacted to meet the above compaction criteria. The clean granular backfill material should be compacted to achieve a relative density greater than 75% or as specified by the geotechnical engineer for the specific material used.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 GROUNDWATER CONTROL

Water should not be allowed to collect near or below the foundation or floor slab areas of the building either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater or surface runoff. Positive site drainage should be provided at all times to reduce infiltration of surface water around the perimeter of the building and beneath the floor slabs. All grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill of the building. It is anticipated that foundation excavations and construction control of water may be accomplished with pumps pumping from properly filtered open sumps.

Proper perimeter drainage mechanisms should be provided along all exterior foundation members. The elevation of the drainage lines should be adjusted to keep water a minimum of two (2) feet below the design subgrade elevation. A free flowing granular drainage fill such as crushed stone is to be employed around all drainage lines with the granular drainage fill encased in a geotextile filter fabric. The perimeter drains should discharge to a storm sewer or drainage ditch by gravity.

4.2 SUBGRADE PREPARATION

The near surface soils present at this site are somewhat sensitive to softening due to rainfall and traffic. It is our experience that damp or wet soils tend to rut under rubber tire vehicle traffic. Maintenance of entrance roads and other areas subjected to construction traffic, such as floor slab areas, is typically required until floor slab construction is completed. If near surface soils become wet and disturbed, excavation and replacement with suitable compacted fill will be necessary. For this site during wet or cool seasons, it is advantageous to place a working course of compacted graded aggregate base over building and road way areas between the time of initial grading and final floor slab construction. The graded aggregate base may need periodic replenishment depending on weather and traffic conditions during construction.

Professional Service Industries Engineering, PLLC recommends that immediately prior to placement of stone and the beginning of floor slab construction, a representative of the Geotechnical Engineer evaluate the floor slab subgrades. If low density or otherwise unsuitable soils are encountered which cannot be adequately densified in place, such soils should be removed and replaced with well-compacted fill material placed in accordance with a previous section of this report or with well-compacted crushed stone materials.

5.0 EXCAVATIONS

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P". This document was established to ensure the safety of workers entering trenches or excavations.

Federal regulation mandates that all excavations, whether they be utility trenches, basement or footing excavations or others (i.e. underground storage tanks), be constructed in accordance with the OSHA requirements. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could risk injury to workers and be liable for substantial financial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in “29 CFR Part 1926”, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSIE, PLLC is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CONSTRUCTION OBSERVATION AND TESTING

PSIE, PLLC should be retained to examine and identify soil exposures created during project excavations in order to verify that soil conditions are as anticipated. PSIE, PLLC further recommends that compacted engineered fill be continuously observed and tested during placement by our representative in order to document the compaction effort. Samples of fill materials should be submitted to Professional Service Industries Engineering, PLLC's laboratory for testing prior to placement of fills on site and should include a moisture-density relationship (Proctor) and sieve analysis including a minus 200 sieve test. Density testing should be performed at a rate of one per 2,500 square feet per six (6)-inch lift in building areas, one test per 10,000-square feet per six (6)-inch lift in pavement areas and one per one hundred linear feet per six (6)-inch lift in utility trench backfill.

Professional Service Industries Engineering, PLLC should also be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related vertical construction activities of this project. Professional Service Industries Engineering, PLLC cannot accept any responsibility for any conditions that deviated from those described in this report, nor for the performance of the foundation, if not engaged to also provide construction observation and testing for this project.

Costs for the recommended observations during construction are beyond the scope of this current consultation. Such future services would be at an additional charge.

7.0 GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. Site exploration identifies actual subsurface conditions only at those points where samples are taken. A geotechnical report is based on conditions that existed at the time of the subsurface exploration. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitute PSIE, PLLC's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSIE, PLLC's experience in working with these conditions.

8.0 REPORT LIMITATIONS

Professional Service Industries Engineering, PLLC's professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. Professional Service Industries Engineering, PLLC is not responsible for the conclusions, opinions or recommendations made by others based on these data. No other warranties are implied or expressed.

The scope of investigation was intended to evaluate soil conditions within the influence of the proposed foundations. The analyses and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed structure.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

Professional Service Industries Engineering, PLLC did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminate in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Site conditions are outside of PSIE, PLLC's control, and mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, Professional Service Industries Engineering, PLLC cannot and shall not be held responsible of the occurrence or recurrence of mold amplification.

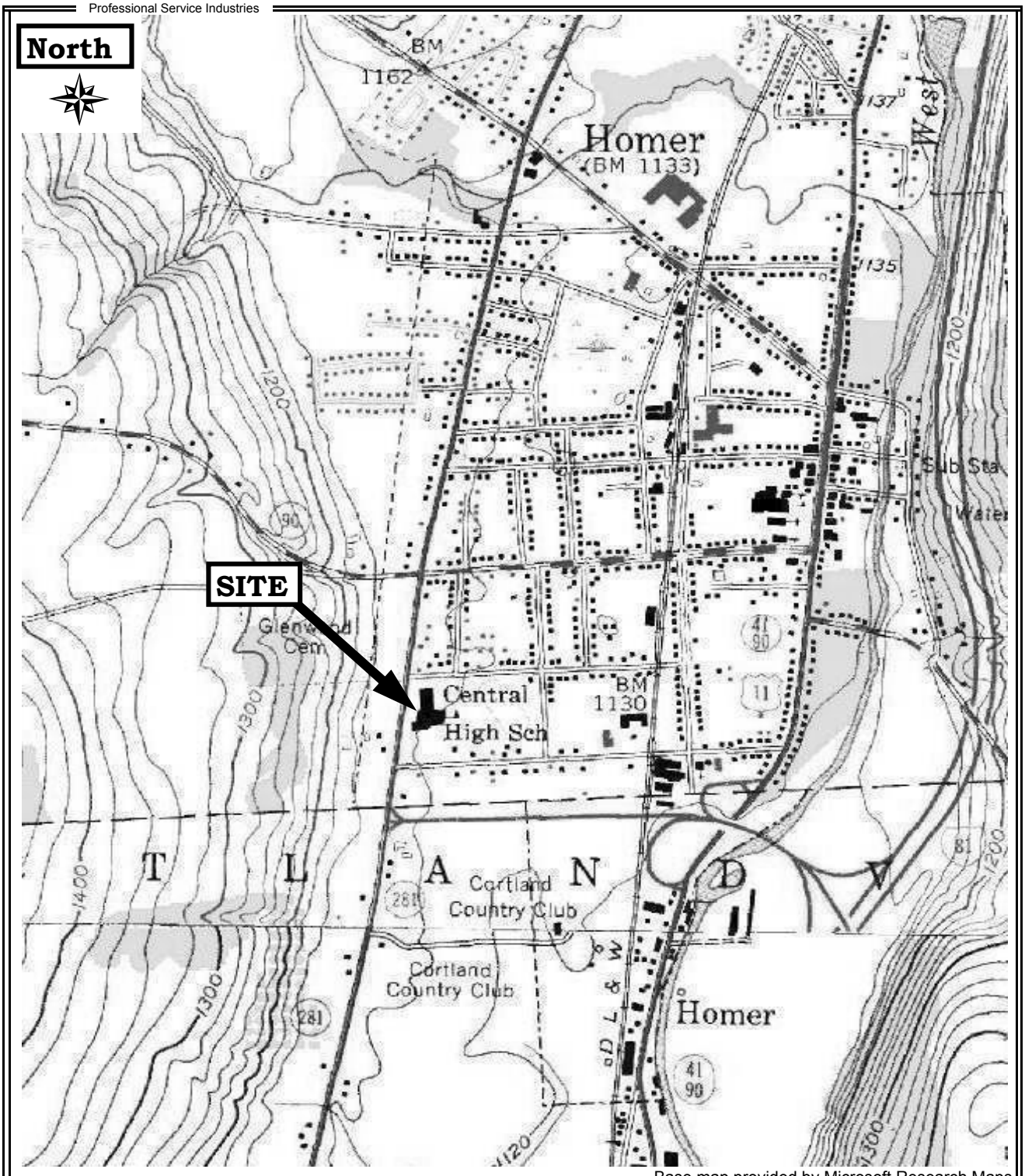
This report has been prepared for the exclusive use of Homer Central School District and their intermediaries, consultants for the specific application to this project at this site. Professional Service Industries Engineering, PLLC warrants that the evaluations and recommendations contained in this report are based on generally accepted professional engineering practices in the field of geotechnical engineering in the local area at the time of this report. No other warranties are implied or expressed.

FIGURES

Figure 1: Site Location Plan

Figure 2: Boring Location Plan

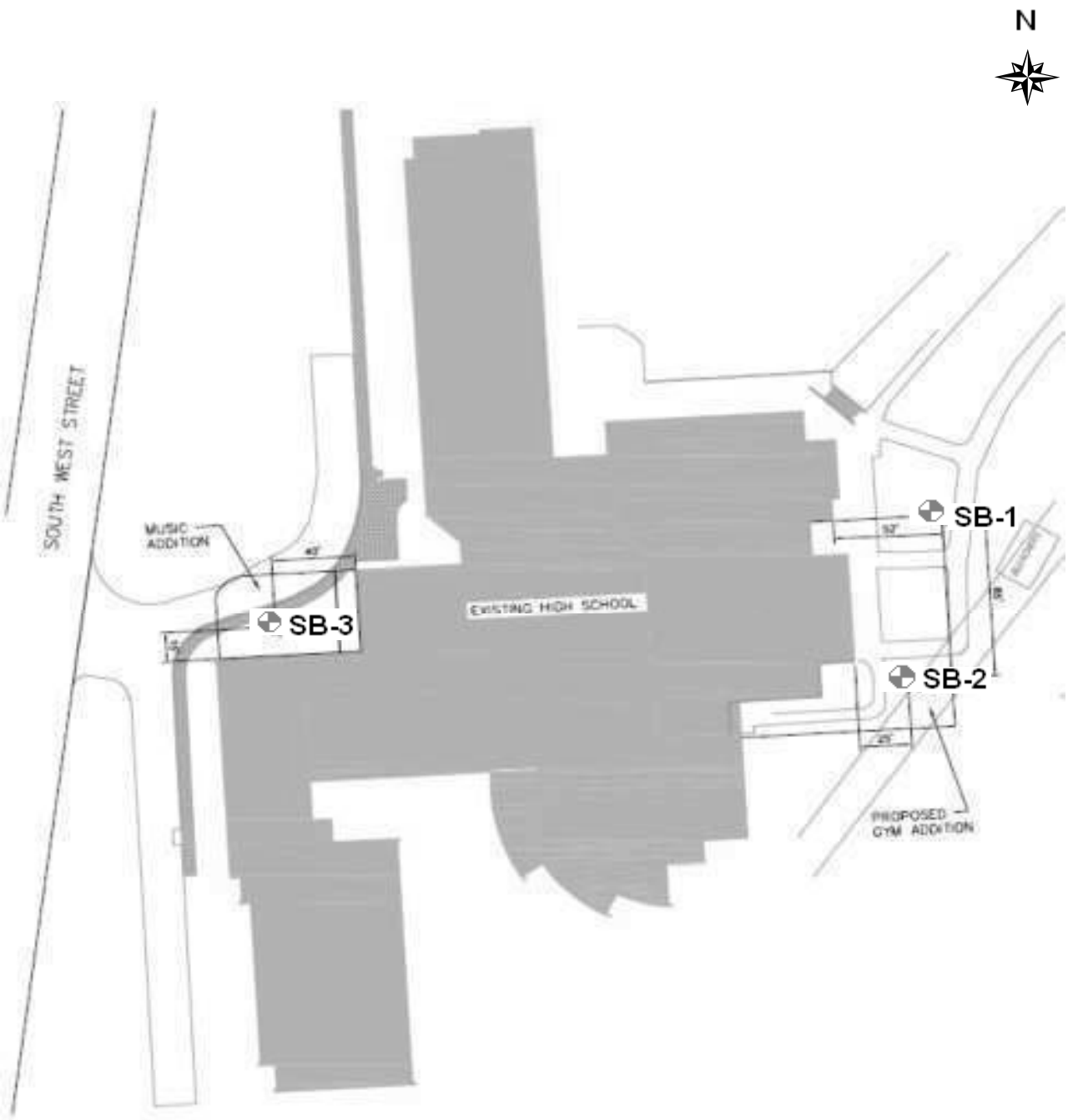
Professional Service Industries



Base map provided by Microsoft Research Maps

Project Name: Homer Senior High School Additions Music Room & Gymnasium Additions 80 South West Street Homer, Cortland County, New York 13077	**General Site Location Plan**	
	Project No.: 0806572	Date: May 14, 2014

Professional Service Industries



NOT TO SCALE

Project Name: Homer Senior High School Additions Music Room & Gymnasium Additions 80 South West Street Homer, Cortland County, New York 13077	**Boring Location Plan**	
	Project No.: 0806572	Date: May 14, 2014

APPENDIX A

Boring Logs

General Notes

Unified Soil Classification System

BORING SB-1

DATE STARTED:	4/23/14	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	4/23/14	**DRILLER:** Carl Rengert	**LOGGED BY:** Steven Pump
COMPLETION DEPTH	30.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	DBS

REMARKS: Hole Caved at 11.5

Water		
	While Drilling	13.5 feet
	Upon Completion	None feet
	Delay	N/A

BORING LOCATION:
See Attached Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0			1	18	8" TOPSOIL POORLY GRADED SAND (SP), fine sand, little silt and medium to fine gravel, brown, very loose, moist	SP	2-2-5 N=7	12		
	5			2	6	POORLY GRADED SAND (SP), medium to fine sand, little medium to fine gravel and silt, brown, very loose to medium dense, moist	SP	8-6-4 N=10	6		
				3	0			3-2-3 N=5	4		
	10			4	12			6-7-8 N=15	6		
	15			5	12	POORLY GRADED SAND (SP), coarse to fine sand, some medium to fine gravel, trace silt, brown, medium dense, saturated		2-3-10 N=13	11		
	20			6	12			4-6-7 N=13	8		
	25			7	4			12-8-9 N=17	8		
	30			8	18	SILT (ML), little fine sand, trace fine gravel, gray, loose, saturated	ML	4-3-3 N=6	21		
						Boring Terminated at 30'					

Professional Service Industries, Inc.
3784 Commerce Court, Suite 300
North Tonawanda, NY 14120
Telephone: (716) 694-8657

PROJECT NO.: 0806572
PROJECT: Homer Senior High School Additions
LOCATION: Music Room & Gymnasium Additions
80 S. West Street
Homer, Cortland County, NY 13077

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING SB-2

DATE STARTED:	4/23/14	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	4/23/14	**DRILLER:** Carl Rengert	**LOGGED BY:** Steven Pump
COMPLETION DEPTH	30.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	DBS

REMARKS: Hole Caved at 9'

Water

While Drilling	20	feet
Upon Completion	None	feet
Delay	N/A	

BORING LOCATION:
See Attached Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0			1	16	8" TOPSOIL POORLY GRADED SAND (SP), medium to fine sand, little clay and silt, trace fine gravel, brown, loose, moist	SP	2-2-6 N=8	31		
	5			2	18	POORLY GRADED SAND (SP), coarse to fine sand, trace silt and fine gravel, brown, loose, moist	SP	3-3-4 N=7	5		
				3	18			3-3-3 N=6	4		
	10			4	18			3-4-6 N=10	5		
	15			5	18	POORLY GRADED SAND (SP), coarse to fine sand, little silt and medium to fine gravel, brown, medium dense, moist ** Cobbles noted	SP	12-11-13 N=24	5		
	20			6	10	POORLY GRADED SAND (SP), coarse to fine sand, some medium to fine gravel, trace silt, brown, loose to medium dense, saturated	SP	4-3-5 N=8	11		
	25			7	12			4-5-6 N=11	10		
	30			8	18	SILTY SAND (SM), fine sand, trace fine gravel, gray, medium dense, saturated	SM	7-8-8 N=16	15		
						Boring Terminated at 30'					

Professional Service Industries, Inc.
3784 Commerce Court, Suite 300
North Tonawanda, NY 14120
Telephone: (716) 694-8657

PROJECT NO.: 0806572
PROJECT: Homer Senior High School Additions
LOCATION: Music Room & Gymnasium Additions
80 S. West Street
Homer, Cortland County, NY 13077

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING SB-3

DATE STARTED:	4/23/14	**DRILL COMPANY:**	PSI, Inc.
DATE COMPLETED:	4/23/14	**DRILLER:** Carl Rengert	**LOGGED BY:** Steven Pump
COMPLETION DEPTH	25.0 ft	**DRILL RIG:**	CME 55
BENCHMARK:	N/A	**DRILLING METHOD:**	Hollow Stem Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	2-in SS
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION: N/A	**OFFSET:** N/A	**REVIEWED BY:**	DBS

REMARKS: Hole Caved at 6'

Water		
	While Drilling	23 feet
	Upon Completion	None feet
	Delay	N/A

BORING LOCATION:
See Attached Boring Location Plan

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✚ LL (0, 25, 50) STRENGTH, tsf ▲ Qu ✳ Qp (0, 2.0, 4.0)	Additional Remarks
	0			1	18	8" TOPSOIL SANDY SILT (ML), fine sand, little clay and rock fragments, brown and black, loose, moist	ML	2-3-5 N=8	19		
	5			2	16	POORLY GRADED SAND (SP), medium to fine sand, little medium to fine gravel and silt, brown, medium dense, moist	SP	12-12-13 N=25	6		
				3	5	** Cobbles noted		9-11-11 N=22	5		
	10			4	18	SILTY SAND (SM), fine sand, trace medium to fine gravel and clay, brown, medium dense, moist	SM	8-7-7 N=14	14		
	15			5	18	POORLY GRADED SAND (SP), coarse to fine sand, some medium to fine gravel, trace silt, brown, very dense to dense, moist ** Cobbles and Boulders noted	SP	25-20-31 N=51	3	>>	
	20			6	18			27-21-27 N=48	4		
	25			7	6	POORLY GRADED SAND (SP), coarse to fine sand, some medium to fine gravel, little silt, brown, dense, saturated	SP	25-20-15 N=35	16		
						Boring Terminated at 25'					

Professional Service Industries, Inc.
3784 Commerce Court, Suite 300
North Tonawanda, NY 14120
Telephone: (716) 694-8657

PROJECT NO.: 0806572
PROJECT: Homer Senior High School Additions
LOCATION: Music Room & Gymnasium Additions
80 S. West Street
Homer, Cortland County, NY 13077

The stratification lines represent approximate boundaries. The transition may be gradual.

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIONLESS SOILS

(Silt, Sand, Gravel and Combinations)

Density

Very Loose	5 blows per foot or less
Loose	6 - 10 blows per foot
Medium Dense	11 - 30 blows per foot
Dense	31 - 50 blows per foot
Very Dense	51 blows per foot or more

Relative Properties

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

Particle Size Indentification

Boulders	8 inch diameter or more	
Cobbles	3 - 8 inch diameter	
Gravel	Coarse	1 - 3 inches
	Medium	1/2 - 1 inch
	Fine	1/4 - 1/2 inch
Sand	Coarse	0.6 mm - 1/4 inch (diameter of pencil lead)
	Medium	0.2 mm - 0.6 mm (diameter of broom straw)
	Fine	0.05 mm - 0.2 mm (diameter of human hair)
Silt		0.002 mm - 0.05 mm (cannot see particles)

COHESIVE SOILS

(Clay, Silt and Combinations)

Consistency

Very soft	3 blows per foot or less
Soft	4 - 5 blows per foot
Medim Stiff	6 - 10 blows per foot
Stiff	11 - 15 blows per foot
Very Stiff	16 - 30 blows per foot
Hard	31 blows per foot or more

Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to very high	over 22

CLASSIFICATION ON LOGS ARE MADE BY VISUAL EXAMINATION OF SAMPLES.

Standard Penetration Test — Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary for ITL to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The quantity of hammer blows for seating the sampler and performing the test are recorded for each 6.0 inches of penetration on the Field Exploration Log (example: 6-10-13). The standard penetration test result can be obtained by adding the last two figures (i.e. 10 + 13 = 23). The reader is referenced to ASTM D1586.

Strata Changes — Boundaries between soil layers are considered approximate based upon observed changes during the drilling operations or noted changes within representative samples.

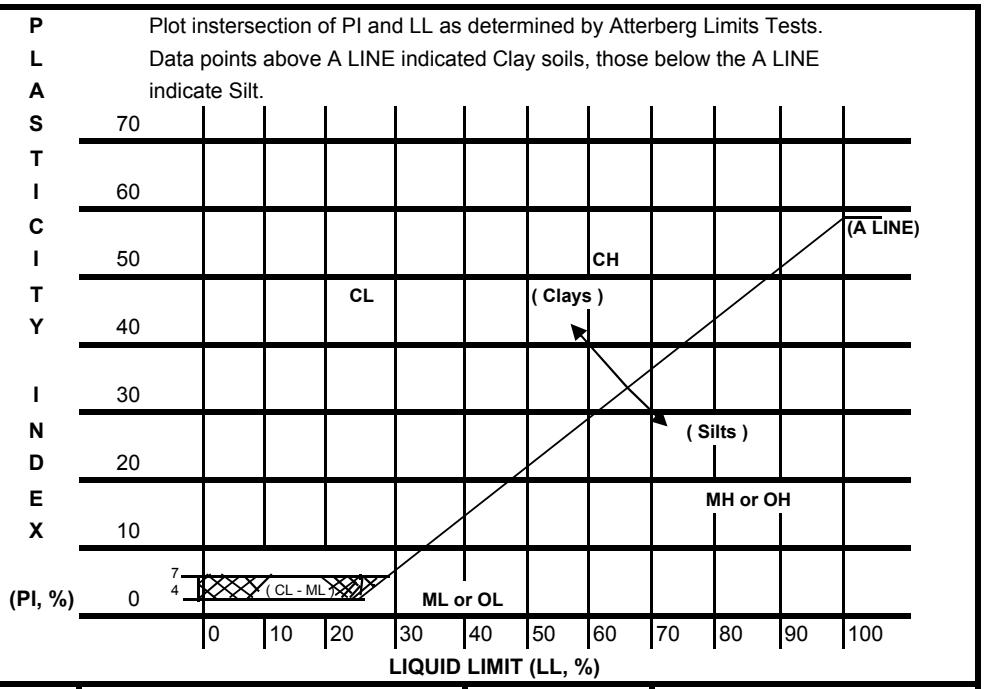
Groundwater — Observations were made to determine either the depth or elevation of water at the times indicated on the Soil Exploration Logs. The water so encountered may be groundwater or perched water. The depth or elevations indicated for water may fluctuate due to seasonal changes or other unknown factors.

United Soil Classification System
ASTM Designation D - 2487

psi Information To Build On
Engineering • Consulting • Testing

Based upon percentage of material passing No. 200 sieve classify as:

Less than 5%	GW, GP, SW, SP
More than 12%	GM, GC, SM, SC
5% to 12%	Borderline, use dual symbols



Coarse Grained Soils (More than half of is larger than No. 200 sieve)	Gravels (More than 50% retained on No.4 sieve)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 4$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} * D_{60}} < 3$
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Does not meet all requirements for GW	
		GM	Silty gravels, gravel-sand-silt mixtures	below A Line, PI < 4	in shaded area 4 < PI < 7 Dual Symbols
		GC	Clayey gravels, gravel-sand-clay mixtures	above A Line, PI > 7	
	Sands (More than 50% passing a No. 4 sieve)	SW	Well graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 6$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} * D_{60}} < 3$
		SP	Poorly graded sands, gravelly sands, little or no fines	Does not meet all requirements for SW	
		SM	Silty sands, sand-silt mixtures	below A Line, PI < 4	in shaded area 4 < PI < 7 Dual Symbols
		SC	Clayey sands, sand-clay mixtures	above A Line, PI > 7	
Fine Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts & Clays (LL less than 50)	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		OL	Organic silts and organic silty clays of low plasticity		
	Silts & Clays (LL greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts		
		CH	Inorganic clays of high plasticity fat clays		
		OH	Organic clays of medium to high plasticity		
	Highly Organic Soil	Pt	Peat and other highly organic soils		

SECTION 00 41 10 - BID FORM
GENERAL CONSTRUCTION CONTRACT

BID FORM

Contract: General Construction

Project: Homer Central School District - 2021 Capital Improvement Project

SEE ADVERTISEMENT FOR BID FOR DATE, TIME AND PLACE FOR RECEIPT OF BIDS

TO: Homer Central School District

FROM: _____

(Name of Bidder)

The undersigned contractor hereby certifies that he fully comprehends the requirements and intent of the Bidding and Contract Documents, the plans and specifications of the proposed work, and being familiar with all the conditions surrounding the construction of the project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, plant and equipment, and other facilities necessary or proper for or incidental to the performance of the proposed work. The work shall be complete within the phased milestone timelines as outlined in Specification Section 01 32 00 - Construction Schedules, Phasing and Site Logistics, and does hereby agree to perform all the

General Construction Scope of Work

of the project in accordance with the Contract Documents at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part, and acknowledges receipt of the following Addenda:

No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____

In accordance with requirements of the Bidding and Contract Documents, the undersigned Contractor offers to perform Work of the Contract as follows:

1.0 LUMP SUM BASE BID: Contractor agrees to perform work of the Base Bid, for a Lump Sum of:

Written: _____
_____ Dollars $ _____

(The above amount, which includes the amounts indicated for Allowances, if any, shall be shown in typing or written in ink in both words and figures. In case of discrepancy, the amount shown in words will govern.)

SECTION 00 41 10 - BID FORM
GENERAL CONSTRUCTION CONTRACT

2.0 ALLOWANCES: Contractor agrees to include in the Base Bid Lump Sum, Applicable Allowance(s) as shown in Division 1, Section 01 21 00 - Allowances.

- Contingency Allowance $ 130,000.00

3.0 UNIT PRICES: The following unit prices are submitted by the undersigned bidder as a proposed basis for additive or deductive adjustments, in the event Contract changes in the work are required involving items described. It is understood and agreed that unit prices are separately subject to acceptance by the Owner and that such prices are not a part of the Contract except as accepted and entered in the agreement. Unit prices shall include all fees, taxes, profit, overhead and similar items. As shown in Division 1, Section 01 22 00 – Unit Prices.

Item Description	Quantity in Base Bid	Unit of Measure	Cost per Unit	Total Included in Base Bid
1. GC-1 Not Used			$_____ =	_____

4.0 ALTERNATES: Contractor agrees to perform Work of Alternate(s) selected as changes to the Base Bid Lump Sum as shown in Division 1, Section 01 23 00 - Alternates.

The Bidder shall submit the following Alternate Bids in accordance with Contract Documents. Alternate bids will be good for the life of the Contract. If selected, shall become a part of the Contract, and shall comply with all of the applicable Contract Documents.

Note: Where the Alternate work does not add to or subtract from the cost of the Base Bid of this work, write "NONE" in the space for Total Add or Deduct. Where the word ADD and the word DEDUCT appear together below, cross out non-applicable word.

ALTERNATE #1 (GC) –

1. Alternate Description – Intermediate Gym Locker Room 118A - Demolition of metal lockers and cast masonry locker base patch floor as defined on contract documents. Mechanical equipment replacement within Intermediate Gym Locker Rooms 117A & 118A as defined on contract documents. New skylight within existing roof skylight footprint over Intermediate Gym Locker Room 117A & 118A as defined on the contract Documents and specification.

Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

SECTION 00 41 10 - BID FORM
GENERAL CONSTRUCTION CONTRACT

5.0 NO COLLUSION OR FRAUD

By submission of this proposal, the undersigned Contractor, and in the case of a joint bid, each party thereto, and each person signing on its or their behalf, certifies that to the best of their knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restriction competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. The prices in this bid have not been knowingly disclosed by and will not knowingly be disclosed prior to opening, directly or indirectly, to any other bidder or to any competitor;

3. No attempt has been made or will be made to induce any other person, partnership or corporation to submit or not to submit a bid;

4. The person signing this bid certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as the person signing in its behalf;

5. That attached hereto (if a corporate bidder) is a certified copy of the resolution authorizing the execution of this certificate by the signature of this bid in behalf of the corporate bidder.

6.0 Non-Collusive Bidding Certification

By submission of this Bid proposal, the bidder certifies that he is complying with Section 103-d of the General Municipal Law of the State of New York as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

(c) Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

7.0 BID SECURITY

The undersigned contractor submits herewith bid security as noted in the Instructions to Bidders. Should the Owner accept this Proposal and the undersigned refuse or neglect, within ten (10) calendar days after receipt of Notice of Award, to execute and deliver an Agreement in the form specified in the Contract Documents, or to execute and deliver a Performance Bond and a Labor and Materials Payment Bond in the amounts required and the form prescribed, this security shall be forfeited and will be retained by the Owner as liquidated damages; otherwise the total amount of the bid security will be returned in accordance with provisions of the bidding requirements.

Legal name of person, partnership, joint venture or corporation: _____

Signature: _____

By (Name): _____

If a corporation, affix corporate seal)

Title: _____

Attest: _____

Date: _____

SECTION 00 41 10 - BID FORM
GENERAL CONSTRUCTION CONTRACT

ADDRESS OF THE BIDDER

Street Address: _____

P.O. Box (if applicable): _____

City, State and Zip Code: _____

Phone Number: _____

If a Corporation:

NAMES OF OFFICERS		ADDRESSES
_____	PRESIDENT	_____
_____	SECRETARY	_____
_____	TREASURER	_____

If a Partnership:

NAMES OF PARTNERS	ADDRESSES
_____	_____
_____	_____

SECTION 00 41 10 - BID FORM
GENERAL CONSTRUCTION CONTRACT

If a Joint Venture:

NAMES OF MEMBERS	ADDRESSES
_____	_____
_____	_____
_____	_____

If a Sole Proprietor:

NAMES	ADDRESS
_____	_____

SECTION 00 41 10 - BID FORM
GENERAL CONSTRUCTION CONTRACT

8.0 CORPORATE RESOLUTION

Resolved that _____
be authorized to sign the bid or proposal of this corporation and upon acceptance of the bid or proposal, to sign the Contract submitted by the Owner on behalf of this corporation, and to include in such bid or proposal the certificate as to non-collusion required by section 103-d of the General Municipal Law of the State of New York as the act of such corporation, and for any inaccuracies or misstatements in such certificate, Bidder shall be liable under the penalty of perjury.

The foregoing is a true and correct copy of the resolution adopted by corporation at a meeting of its Board of Directors on the _____ day of _____.

(Seal of Corporation)

_____

Secretary

_____

Name (Signature)

_____

Name (Print) Secretary

IRANIAN ENERGY DIVESTMENT CERTIFICATION

No bid shall be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of joint bid, each party thereto certifies, as to its own organization, under penalty of perjury, that to the best of their knowledge and belief, bidder is not on the list created pursuant to paragraph (b) of section 165-a of the state finance law.

_____
(Individual)

_____
(Corporation)

_____
(Signature of Officer)

_____
(Date)

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

BID FORM

Contract: Plumbing Contract

Project: Homer Central School District - 2021 Capital Improvement Project

SEE ADVERTISEMENT FOR BID FOR DATE, TIME AND PLACE FOR RECEIPT OF BIDS

TO: Homer Central School District

FROM: _____

_____
(Name of Bidder)

The undersigned contractor hereby certifies that he fully comprehends the requirements and intent of the Bidding and Contract Documents, the plans and specifications of the proposed work, and being familiar with all the conditions surrounding the construction of the project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, plant and equipment, and other facilities necessary or proper for or incidental to the performance of the proposed work. The work shall be complete within the phased milestone timelines as outlined in Specification Section 01 32 00 - Construction Schedules, Phasing and Site Logistics, and does hereby agree to perform all the

General Construction Scope of Work

of the project in accordance with the Contract Documents at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part, and acknowledges receipt of the following Addenda:

No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____

In accordance with requirements of the Bidding and Contract Documents, the undersigned Contractor offers to perform Work of the Contract as follows:

1.0 LUMP SUM BASE BID: Contractor agrees to perform work of the Base Bid, for a Lump Sum of:

Written: _____
_____ Dollars $ _____

(The above amount, which includes the amounts indicated for Allowances, if any, shall be shown in typing or written in ink in both words and figures. In case of discrepancy, the amount shown in words will govern.)

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

2.0 ALLOWANCES: Contractor agrees to include in the Base Bid Lump Sum, Applicable Allowance(s) as shown in Division 1, Section 01 21 00 - Allowances.

- Contingency Allowance $ 20,000.00

3.0 UNIT PRICES: The following unit prices are submitted by the undersigned bidder as a proposed basis for additive or deductive adjustments, in the event Contract changes in the work are required involving items described. It is understood and agreed that unit prices are separately subject to acceptance by the Owner and that such prices are not a part of the Contract except as accepted and entered in the agreement. Unit prices shall include all fees, taxes, profit, overhead and similar items. As shown in Division 1, Section 01 22 00 – Unit Prices.

Item Description	Quantity in Base Bid	Unit of Measure	Cost per Unit	Total Included in Base Bid
1. PC-1 Not Used			$_____ =	_____

4.0 ALTERNATES: Contractor agrees to perform Work of Alternate(s) selected as changes to the Base Bid Lump Sum as shown in Division 1, Section 01 23 00 - Alternates.

The Bidder shall submit the following Alternate Bids in accordance with Contract Documents. Alternate bids will be good for the life of the Contract. If selected, shall become a part of the Contract, and shall comply with all of the applicable Contract Documents.

Note: Where the Alternate work does not add to or subtract from the cost of the Base Bid of this work, write "NONE" in the space for Total Add or Deduct. Where the word ADD and the word DEDUCT appear together below, cross out non-applicable word.

ALTERNATE #3 (PC) –

Alternate Description – Intermediate Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #4 (PC) –

Alternate Description – Elementary Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

5.0 NO COLLUSION OR FRAUD

By submission of this proposal, the undersigned Contractor, and in the case of a joint bid, each party thereto, and each person signing on its or their behalf, certifies that to the best of their knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restriction competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. The prices in this bid have not been knowingly disclosed by and will not knowingly be disclosed prior to opening, directly or indirectly, to any other bidder or to any competitor;

3. No attempt has been made or will be made to induce any other person, partnership or corporation to submit or not to submit a bid;

4. The person signing this bid certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as the person signing in its behalf;

5. That attached hereto (if a corporate bidder) is a certified copy of the resolution authorizing the execution of this certificate by the signature of this bid in behalf of the corporate bidder.

6.0 Non-Collusive Bidding Certification

By submission of this Bid proposal, the bidder certifies that he is complying with Section 103-d of the General Municipal Law of the State of New York as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

(c) Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

7.0 BID SECURITY

The undersigned contractor submits herewith bid security as noted in the Instructions to Bidders. Should the Owner accept this Proposal and the undersigned refuse or neglect, within ten (10) calendar days after receipt of Notice of Award, to execute and deliver an Agreement in the form specified in the Contract Documents, or to execute and deliver a Performance Bond and a Labor and Materials Payment Bond in the amounts required and the form prescribed, this security shall be forfeited and will be retained by the Owner as liquidated damages; otherwise the total amount of the bid security will be returned in accordance with provisions of the bidding requirements.

Legal name of person, partnership, joint venture or corporation: _____

Signature: _____

By (Name): _____

If a corporation, affix corporate seal)

Title: _____

Attest: _____

Date: _____

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

ADDRESS OF THE BIDDER

Street Address: _____

_____

P.O. Box (if applicable): _____

_____

City, State and Zip Code: _____

_____

Phone Number: _____

_____

If a Corporation:

NAMES OF OFFICERS		ADDRESSES
_____	PRESIDENT	_____
_____		_____
_____	SECRETARY	_____
_____		_____
_____	TREASURER	_____
_____		_____

If a Partnership:

NAMES OF PARTNERS	ADDRESSES
_____	_____
_____	_____
_____	_____
_____	_____

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

If a Joint Venture:

NAMES OF MEMBERS	ADDRESSES
_____	_____
_____	_____
_____	_____

If a Sole Proprietor:

NAMES	ADDRESS
_____	_____

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

8.0 CORPORATE RESOLUTION

Resolved that _____
be authorized to sign the bid or proposal of this corporation and upon acceptance of the bid or proposal, to sign the Contract submitted by the Owner on behalf of this corporation, and to include in such bid or proposal the certificate as to non-collusion required by section 103-d of the General Municipal Law of the State of New York as the act of such corporation, and for any inaccuracies or misstatements in such certificate, Bidder shall be liable under the penalty of perjury.

The foregoing is a true and correct copy of the resolution adopted by corporation at a meeting of its Board of Directors on the _____ day of _____.

(Seal of Corporation)

_____

Secretary

_____

Name (Signature)

_____

Name (Print) Secretary

SECTION 00 41 20 - BID FORM
PLUMBING CONTRACT

IRANIAN ENERGY DIVESTMENT CERTIFICATION

No bid shall be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of joint bid, each party thereto certifies, as to its own organization, under penalty of perjury, that to the best of their knowledge and belief, bidder is not on the list created pursuant to paragraph (b) of section 165-a of the state finance law.

_____
(Individual)

_____
(Corporation)

_____
(Signature of Officer)

_____
(Date)

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

BID FORM

Contract: HVAC Contract

Project: Homer Central School District - 2021 Capital Improvement Project

SEE ADVERTISEMENT FOR BID FOR DATE, TIME AND PLACE FOR RECEIPT OF BIDS

TO: Homer Central School District

FROM: _____

_____
(Name of Bidder)

The undersigned contractor hereby certifies that he fully comprehends the requirements and intent of the Bidding and Contract Documents, the plans and specifications of the proposed work, and being familiar with all the conditions surrounding the construction of the project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, plant and equipment, and other facilities necessary or proper for or incidental to the performance of the proposed work. The work shall be complete within the phased milestone timelines as outlined in Specification Section 01 32 00 - Construction Schedules, Phasing and Site Logistics, and does hereby agree to perform all the

General Construction Scope of Work

of the project in accordance with the Contract Documents at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part, and acknowledges receipt of the following Addenda:

No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____

In accordance with requirements of the Bidding and Contract Documents, the undersigned Contractor offers to perform Work of the Contract as follows:

1.0 LUMP SUM BASE BID: Contractor agrees to perform work of the Base Bid, for a Lump Sum of:

Written: _____
_____ Dollars $ _____

(The above amount, which includes the amounts indicated for Allowances, if any, shall be shown in typing or written in ink in both words and figures. In case of discrepancy, the amount shown in words will govern.)

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

2.0 ALLOWANCES: Contractor agrees to include in the Base Bid Lump Sum, Applicable Allowance(s) as shown in Division 1, Section 01 21 00 - Allowances.

- Contingency Allowance $ 55,000.00

3.0 UNIT PRICES: The following unit prices are submitted by the undersigned bidder as a proposed basis for additive or deductive adjustments, in the event Contract changes in the work are required involving items described. It is understood and agreed that unit prices are separately subject to acceptance by the Owner and that such prices are not a part of the Contract except as accepted and entered in the agreement. Unit prices shall include all fees, taxes, profit, overhead and similar items. As shown in Division 1, Section 01 22 00 – Unit Prices.

Item Description	Quantity in Base Bid	Unit of Measure	Cost per Unit	Total Included in Base Bid
1. HC-1 NOT USED			$_____ =	_____

4.0 ALTERNATES: Contractor agrees to perform Work of Alternate(s) selected as changes to the Base Bid Lump Sum as shown in Division 1, Section 01 23 00 - Alternates.

The Bidder shall submit the following Alternate Bids in accordance with Contract Documents. Alternate bids will be good for the life of the Contract. If selected, shall become a part of the Contract, and shall comply with all of the applicable Contract Documents.

Note: Where the Alternate work does not add to or subtract from the cost of the Base Bid of this work, write "NONE" in the space for Total Add or Deduct. Where the word ADD and the word DEDUCT appear together below, cross out non-applicable word.

ALTERNATE #1 (HC) –

Alternate Description – Intermediate Gym Locker Room 118A - Demolition of metal lockers and cast masonry locker base patch floor as defined on contract documents. Mechanical equipment replacement within Intermediate Gym Locker Rooms 117A & 118A as defined on contract documents. New skylight within existing roof skylight footprint over Intermediate Gym Locker Room 117A & 118A as defined on the contract Documents and specification.

Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

ALTERNATE #3 (HC) –

Alternate Description – Intermediate Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing.

Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #4 (HC) –

Alternate Description – Elementary Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing.

Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

5.0 NO COLLUSION OR FRAUD

By submission of this proposal, the undersigned Contractor, and in the case of a joint bid, each party thereto, and each person signing on its or their behalf, certifies that to the best of their knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restriction competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. The prices in this bid have not been knowingly disclosed by and will not knowingly be disclosed prior to opening, directly or indirectly, to any other bidder or to any competitor;

3. No attempt has been made or will be made to induce any other person, partnership or corporation to submit or not to submit a bid;

4. The person signing this bid certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as the person signing in its behalf;

5. That attached hereto (if a corporate bidder) is a certified copy of the resolution authorizing the execution of this certificate by the signature of this bid in behalf of the corporate bidder.

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

6.0 Non-Collusive Bidding Certification

By submission of this Bid proposal, the bidder certifies that he is complying with Section 103-d of the General Municipal Law of the State of New York as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

(c) Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

7.0 BID SECURITY

The undersigned contractor submits herewith bid security as noted in the Instructions to Bidders. Should the Owner accept this Proposal and the undersigned refuse or neglect, within ten (10) calendar days after receipt of Notice of Award, to execute and deliver an Agreement in the form specified in the Contract Documents, or to execute and deliver a Performance Bond and a Labor and Materials Payment Bond in the amounts required and the form prescribed, this security shall be forfeited and will be retained by the Owner as liquidated damages; otherwise the total amount of the bid security will be returned in accordance with provisions of the bidding requirements.

Legal name of person, partnership, joint venture or corporation: _____

Signature: _____

By (Name): _____

If a corporation, affix corporate seal)

Title: _____

Attest: _____

Date: _____

ADDRESS OF THE BIDDER

Street Address: _____

P.O. Box (if applicable): _____

City, State and Zip Code: _____

Phone Number: _____

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

If a Corporation:

NAMES OF OFFICERS		ADDRESSES
_____	PRESIDENT	_____
_____	SECRETARY	_____
_____	TREASURER	_____

If a Partnership:

NAMES OF PARTNERS	ADDRESSES
_____	_____
_____	_____

If a Joint Venture:

NAMES OF MEMBERS	ADDRESSES
_____	_____
_____	_____
_____	_____

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

If a Sole Proprietor:

NAMES _____

ADDRESS _____

8.0 CORPORATE RESOLUTION

Resolved that _____ be authorized to sign the bid or proposal of this corporation and upon acceptance of the bid or proposal, to sign the Contract submitted by the Owner on behalf of this corporation, and to include in such bid or proposal the certificate as to non-collusion required by section 103-d of the General Municipal Law of the State of New York as the act of such corporation, and for any inaccuracies or misstatements in such certificate, Bidder shall be liable under the penalty of perjury.

The foregoing is a true and correct copy of the resolution adopted by corporation at a meeting of its Board of Directors on the _____ day of _____.

(Seal of Corporation)

_____

Secretary

_____

Name (Signature)

_____

Name (Print) Secretary

SECTION 00 41 30 - BID FORM
MC / HVAC CONTRACT

IRANIAN ENERGY DIVESTMENT CERTIFICATION

No bid shall be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of joint bid, each party thereto certifies, as to its own organization, under penalty of perjury, that to the best of their knowledge and belief, bidder is not on the list created pursuant to paragraph (b) of section 165-a of the state finance law.

_____
(Individual)

_____
(Corporation)

_____
(Signature of Officer)

_____
(Date)

SECTION 00 41 40 - BID FORM
ELECTRICAL CONTRACT

BID FORM

Contract: Electrical Contract

Project: Homer Central School District - 2021 Capital Improvement Project

SEE ADVERTISEMENT FOR BID FOR DATE, TIME AND PLACE FOR RECEIPT OF BIDS

TO: Homer Central School District

FROM: _____

_____
(Name of Bidder)

The undersigned contractor hereby certifies that he fully comprehends the requirements and intent of the Bidding and Contract Documents, the plans and specifications of the proposed work, and being familiar with all the conditions surrounding the construction of the project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, plant and equipment, and other facilities necessary or proper for or incidental to the performance of the proposed work. The work shall be complete within the phased milestone timelines as outlined in Specification Section 01 32 00 - Construction Schedules, Phasing and Site Logistics, and does hereby agree to perform all the

General Construction Scope of Work

of the project in accordance with the Contract Documents at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part, and acknowledges receipt of the following Addenda:

No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____

In accordance with requirements of the Bidding and Contract Documents, the undersigned Contractor offers to perform Work of the Contract as follows:

1.0 LUMP SUM BASE BID: Contractor agrees to perform work of the Base Bid, for a Lump Sum of:

Written: _____
_____ Dollars $ _____

(The above amount, which includes the amounts indicated for Allowances, if any, shall be shown in typing or written in ink in both words and figures. In case of discrepancy, the amount shown in words will govern.)

SECTION 00 41 40 - BID FORM
ELECTRICAL CONTRACT

2.0 ALLOWANCES: Contractor agrees to include in the Base Bid Lump Sum, Applicable Allowance(s) as shown in Division 1, Section 01 21 00 - Allowances.

- Contingency Allowance $ 65,000.00
- HES Primary Power Replacement $ 60,000.00

3.0 UNIT PRICES: The following unit prices are submitted by the undersigned bidder as a proposed basis for additive or deductive adjustments, in the event Contract changes in the work are required involving items described. It is understood and agreed that unit prices are separately subject to acceptance by the Owner and that such prices are not a part of the Contract except as accepted and entered in the agreement. Unit prices shall include all fees, taxes, profit, overhead and similar items. As shown in Division 1, Section 01 22 00 – Unit Prices.

Item Description	Quantity in Base Bid	Unit of Measure	Cost per Unit	Total Included in Base Bid
1. HC-1 NOT USED			$_____	= _____

4.0 ALTERNATES: Contractor agrees to perform Work of Alternate(s) selected as changes to the Base Bid Lump Sum as shown in Division 1, Section 01 23 00 - Alternates.

The Bidder shall submit the following Alternate Bids in accordance with Contract Documents. Alternate bids will be good for the life of the Contract. If selected, shall become a part of the Contract, and shall comply with all of the applicable Contract Documents.

Note: Where the Alternate work does not add to or subtract from the cost of the Base Bid of this work, write "NONE" in the space for Total Add or Deduct. Where the word ADD and the word DEDUCT appear together below, cross out non-applicable word.

ALTERNATE #1 (EC) –

Alternate Description – Demolition of metal lockers and cast masonry locker base patch floor as defined on contract documents. Mechanical equipment replacement within Intermediate Gym Locker Rooms 117A & 118A as defined on contract documents. New skylight within existing roof skylight footprint over Intermediate Gym Locker Room 117A & 118A as defined on the Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #2 (EC) –

Intermediate Theatrical scope called out within all IJ-TL & IJ-TS drawings and specification sections 1 9 10 00 – Performance Sound System & 19 20 00 Theatrical Lighting and Relay Systems as defined on the contract documents and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #3 (EC) –

Alternate Description – Intermediate Roof scope as called out on the contract documents. Exiting mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #4 (EC) –

Alternate Description – Elementary Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing.Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #7 (EC) –

Alternate Description – Intermediate / Junior High School Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #8 (EC) –

Alternate Description – High School Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

5.0 NO COLLUSION OR FRAUD

By submission of this proposal, the undersigned Contractor, and in the case of a joint bid, each party thereto, and each person signing on its or their behalf, certifies that to the best of their knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restriction competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. The prices in this bid have not been knowingly disclosed by and will not knowingly be disclosed prior to opening, directly or indirectly, to any other bidder or to any competitor;

SECTION 00 41 40 - BID FORM
ELECTRICAL CONTRACT

3. No attempt has been made or will be made to induce any other person, partnership or corporation to submit or not to submit a bid;

4. The person signing this bid certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as the person signing in its behalf;

5. That attached hereto (if a corporate bidder) is a certified copy of the resolution authorizing the execution of this certificate by the signator of this bid in behalf of the corporate bidder.

6.0 Non-Collusive Bidding Certification

By submission of this Bid proposal, the bidder certifies that he is complying with Section 103-d of the General Municipal Law of the State of New York as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

(c) Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

7.0 BID SECURITY

The undersigned contractor submits herewith bid security as noted in the Instructions to Bidders. Should the Owner accept this Proposal and the undersigned refuse or neglect, within ten (10) calendar days after receipt of Notice of Award, to execute and deliver an Agreement in the form specified in the Contract Documents, or to execute and deliver a Performance Bond and a Labor and Materials Payment Bond in the amounts required and the form prescribed, this security shall be forfeited and will be retained by the Owner as liquidated damages; otherwise the total amount of the bid security will be returned in accordance with provisions of the bidding requirements.

Legal name of person, partnership, joint venture or corporation: _____

Signature: _____

By (Name): _____

If a corporation, affix corporate seal)

Title: _____

Attest: _____

Date: _____

ADDRESS OF THE BIDDER

Street Address: _____

_____

P.O. Box (if applicable): _____

_____

City, State and Zip Code: _____

_____

Phone Number: _____

_____

SECTION 00 41 40 - BID FORM
ELECTRICAL CONTRACT

If a Corporation:

NAMES OF OFFICERS		ADDRESSES
_____	PRESIDENT	_____
_____	SECRETARY	_____
_____	TREASURER	_____

If a Partnership:

NAMES OF PARTNERS	ADDRESSES
_____	_____
_____	_____

If a Joint Venture:

NAMES OF MEMBERS	ADDRESSES
_____	_____
_____	_____
_____	_____

SECTION 00 41 40 - BID FORM
ELECTRICAL CONTRACT

If a Sole Proprietor:

NAMES _____

ADDRESS _____

8.0 CORPORATE RESOLUTION

Resolved that _____ be authorized to sign the bid or proposal of this corporation and upon acceptance of the bid or proposal, to sign the Contract submitted by the Owner on behalf of this corporation, and to include in such bid or proposal the certificate as to non-collusion required by section 103-d of the General Municipal Law of the State of New York as the act of such corporation, and for any inaccuracies or misstatements in such certificate, Bidder shall be liable under the penalty of perjury.

The foregoing is a true and correct copy of the resolution adopted by corporation at a meeting of its Board of Directors on the _____ day of _____.

(Seal of Corporation)

_____

Secretary

_____

Name (Signature)

_____

Name (Print) Secretary

SECTION 00 41 40 - BID FORM
ELECTRICAL CONTRACT

IRANIAN ENERGY DIVESTMENT CERTIFICATION

No bid shall be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of joint bid, each party thereto certifies, as to its own organization, under penalty of perjury, that to the best of their knowledge and belief, bidder is not on the list created pursuant to paragraph (b) of section 165-a of the state finance law.

_____
(Individual)

_____
(Corporation)

_____
(Signature of Officer)

_____
(Date)

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

BID FORM

Contract: Site Work Contract

Project: Homer Central School District - 2021 Capital Improvement Project

SEE ADVERTISEMENT FOR BID FOR DATE, TIME AND PLACE FOR RECEIPT OF BIDS

TO: Homer Central School District

FROM: _____
(Name of Bidder)

The undersigned contractor hereby certifies that he fully comprehends the requirements and intent of the Bidding and Contract Documents, the plans and specifications of the proposed work, and being familiar with all the conditions surrounding the construction of the project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies, plant and equipment, and other facilities necessary or proper for or incidental to the performance of the proposed work. The work shall be complete within the phased milestone timelines as outlined in Specification Section 01 32 00 - Construction Schedules, Phasing and Site Logistics, and does hereby agree to perform all the

General Construction Scope of Work

of the project in accordance with the Contract Documents at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part, and acknowledges receipt of the following Addenda:

No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____
No. _____ dated _____

In accordance with requirements of the Bidding and Contract Documents, the undersigned Contractor offers to perform Work of the Contract as follows:

1.0 LUMP SUM BASE BID: Contractor agrees to perform work of the Base Bid, for a Lump Sum of:

Written: _____
_____ Dollars $ _____

(The above amount, which includes the amounts indicated for Allowances, if any, shall be shown in typing or written in ink in both words and figures. In case of discrepancy, the amount shown in words will govern.)

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

2.0 ALLOWANCES: Contractor agrees to include in the Base Bid Lump Sum, Applicable Allowance(s) as shown in Division 1, Section 01 21 00 - Allowances.

- Contingency Allowance $ 100,000.00

3.0 UNIT PRICES: The following unit prices are submitted by the undersigned bidder as a proposed basis for additive or deductive adjustments, in the event Contract changes in the work are required involving items described. It is understood and agreed that unit prices are separately subject to acceptance by the Owner and that such prices are not a part of the Contract except as accepted and entered in the agreement. Unit prices shall include all fees, taxes, profit, overhead and similar items. As shown in Division 1, Section 01 22 00 – Unit Prices.

Item Description	Quantity in Base Bid	Unit of Measure	Cost per Unit	Total Included in Base Bid

1. SC-1 Granular Base. Description: Addition or deletion of compacted granular base. See relevant Specification Sections
   Unit of Measurement: Cubic Yard $_____

2. SC-2 Asphalt Paving Base. Description: Construction of additional aggregate base for under asphalt paving as indicated on the Drawings. Work includes excavation and aggregate base course placement. See relevant Specification Sections.
   Unit of Measurement: Cubic Yard $_____

3. SC-3 Asphalt Standard Duty Paving. Description: Addition or deletion of standard duty asphalt paving section as indicated on the Drawings. Work includes aggregate base course. See Relevant Specification Sections.
   Unit of Measurement: Square Yard $_____

4. SC-4 Asphalt Heavy Duty Paving. Description: Addition or deletion of heavy-duty asphalt paving section as indicated on the Drawings. Work includes aggregate base course. See relevant Specification Sections.
   Unit of Measurement: Square Yard $_____

5. SC-5 Excavation and Replacement of Unsuitable Material Below Subgrade. Description: Excavation and removal from site, material below subgrade level outside building footprint deemed unsuitable by and as directed by Architect/Engineer and new backfill to subgrade with select granular fill. See relevant Specification Section.
   Unit of Measurement: Cubic Yard $_____

6. SC-6 Concrete Walks. Description: Addition or deletion of Concrete Sidewalk and subbase. See relevant details and specification sections.
   Unit of Measurement: Square Foot $_____

4.0 ALTERNATES: Contractor agrees to perform Work of Alternate(s) selected as changes to the Base Bid Lump Sum as shown in Division 1, Section 01 23 00 - Alternates.

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

The Bidder shall submit the following Alternate Bids in accordance with Contract Documents. Alternate bids will be good for the life of the Contract. If selected, shall become a part of the Contract, and shall comply with all of the applicable Contract Documents.

Note: Where the Alternate work does not add to or subtract from the cost of the Base Bid of this work, write "NONE" in the space for Total Add or Deduct. Where the word ADD and the word DEDUCT appear together below, cross out non-applicable word.

ALTERNATE #5 (SC) –

Alternate Description – Elementary exterior perimeter fence replacement – removal of existing perimeter fence and tree clean up along with furnish new fence system as defined on the contract documents. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #6 (SC) –

Alternate Description – Elementary exterior scope off James Street driveway, parking lot and fencing system as defined on the contract documents. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #7 (SC) –

Alternate Description – Intermediate / Junior High Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #8 (SC) –

Alternate Description – High School Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #9 (SC) –

Alternate Description – Intermediate Playground Surface - Furnish poured in place playground surface. Surface shall have two colors as defined on contract documents and specification Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

ALTERNATE #10 (SC) –

Alternate Description – Elementary Playground Surface - Furnish poured in place playground surface. Surface shall have two colors as defined on contract documents and specification. Refer to drawings and specifications.

Written: **ADD / DEDUCT** _____
Dollars $ _____

5.0 NO COLLUSION OR FRAUD

By submission of this proposal, the undersigned Contractor, and in the case of a joint bid, each party thereto, and each person signing on its or their behalf, certifies that to the best of their knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restriction competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. The prices in this bid have not been knowingly disclosed by and will not knowingly be disclosed prior to opening, directly or indirectly, to any other bidder or to any competitor;

3. No attempt has been made or will be made to induce any other person, partnership or corporation to submit or not to submit a bid;

4. The person signing this bid certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as the person signing in its behalf;

5. That attached hereto (if a corporate bidder) is a certified copy of the resolution authorizing the execution of this certificate by the signature of this bid in behalf of the corporate bidder.

6.0 Non-Collusive Bidding Certification

By submission of this Bid proposal, the bidder certifies that he is complying with Section 103-d of the General Municipal Law of the State of New York as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or

official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

(c) Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

7.0 BID SECURITY

The undersigned contractor submits herewith bid security as noted in the Instructions to Bidders. Should the Owner accept this Proposal and the undersigned refuse or neglect, within ten (10) calendar days after receipt of Notice of Award, to execute and deliver an Agreement in the form specified in the Contract Documents, or to execute and deliver a Performance Bond and a Labor and Materials Payment Bond in the amounts required and the form prescribed, this security shall be forfeited and will be retained by the Owner as liquidated damages; otherwise the total amount of the bid security will be returned in accordance with provisions of the bidding requirements.

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

Legal name of person, partnership, joint venture or corporation: _____

_____

Signature: _____

By (Name): _____

If a corporation, affix corporate seal)

Title: _____

Attest: _____

Date: _____

ADDRESS OF THE BIDDER

Street Address: _____

_____

P.O. Box (if applicable): _____

_____

City, State and Zip Code: _____

_____

Phone Number: _____

_____

If a Corporation:

NAMES OF OFFICERS		ADDRESSES
_____	PRESIDENT	_____
_____		_____
		_____
		_____
_____	SECRETARY	_____
_____		_____
		_____
		_____
_____	TREASURER	_____
_____		_____
		_____
		_____

If a Partnership:

NAMES OF PARTNERS ADDRESSES

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

If a Joint Venture:

NAMES OF MEMBERS

ADDRESSES

If a Sole Proprietor:

NAMES

ADDRESS

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

8.0 CORPORATE RESOLUTION

Resolved that _____
be authorized to sign the bid or proposal of this corporation and upon acceptance of the bid or proposal, to sign the Contract submitted by the Owner on behalf of this corporation, and to include in such bid or proposal the certificate as to non-collusion required by section 103-d of the General Municipal Law of the State of New York as the act of such corporation, and for any inaccuracies or misstatements in such certificate, Bidder shall be liable under the penalty of perjury.

The foregoing is a true and correct copy of the resolution adopted by corporation at a meeting of its Board of Directors on the _____ day of _____.

(Seal of Corporation)

_____

Secretary

_____

Name (Signature)

_____

Name (Print) Secretary

SECTION 00 41 50 - BID FORM
SITE WORK CONTRACT

IRANIAN ENERGY DIVESTMENT CERTIFICATION

No bid shall be accepted that does not have this form completely executed.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of joint bid, each party thereto certifies, as to its own organization, under penalty of perjury, that to the best of their knowledge and belief, bidder is not on the list created pursuant to paragraph (b) of section 165-a of the state finance law.

_____
(Individual)

_____
(Corporation)

_____
(Signature of Officer)

_____
(Date)

SECTION 00 44 00

EQUIVALENT LISTING

PRIME CONTRACT: _____

.

SUBMITTED BY 3 LOW BIDDERS WITHIN 72 HOURS AFTER BID OPENING

In accordance with Article 3 of Instructions to Bidders, list proposed equivalents and corresponding specified products below. Complete and submit additional copies of this form as necessary for additional products.

Attach additional sheet identifying any aspect of the Contract Documents that cannot be complied with by the manufacturer or supplier of the proposed equivalent product.

Specified Product	Equivalent Product
Technical Section:_____	Manufacturer:_____
Specified Product:_____	Designation:_____
Technical Section:_____	Manufacturer:_____
Specified Product:_____	Designation:_____
Technical Section:_____	Manufacturer:_____
Specified Product:_____	Designation:_____
Technical Section:_____	Manufacturer:_____
Specified Product:_____	Designation:_____
Technical Section:_____	Manufacturer:_____
Specified Section:_____	Designation:_____
Technical Section:_____	Manufacturer:_____

END OF SECTION

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Homer Central School District
88 South West Road
Homer, NY 13077

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory

or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

	~~*(Contractor as Principal)*~~*(Principal)* *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 09:19:43 ET on 07/29/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ – 2010, Bid Bond, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 00 45 46

FEDERAL AND STATE CERTIFICATION

INTRODUCTION:

Pursuant to Section 103, Subdivision 1-c of the New York General Municipal Law in the conduct of public bidding, the law requires the officer, board or agency of any political subdivision or of any district therein, to consider whether the putative low bidder or any substantially owned affiliated entity of the putative low bidder has been found to be in violation of any of three federal laws, specifically, the Davis-Bacon Act, the federal prevailing wage statute, the Copeland Act and the Contract Hours and Safety Standards Act which covers hours of work and safety standards in federal public contracting. If the putative low bidder is not in compliance with the named federal laws, then the Owner may not award the contract.

I, _____the _____of_____
(Name) (Title) (Company)

swear of affirm that the following is true:

1. The company, its principals or entities related to the company named above, is not now, nor ever has been, debarred from contracting with the United States Government or any State government.

2. The company is not now under investigation by any agency of the Federal Government or the government of any State for any actions by the company, its principals or any related entity, for any alleged malfeasance or misfeasance of any kind or nature which could lead to a debarment from governmental contracting or criminal prosecution, as well as render any contracts signed in reliance on this certification voidable by the party relying on this certification.

3. I have full legal authority under my company's organizational documents or bylaws to make this certification on the company's behalf.

4. I understand that submission of a false statement on this document will subject me to criminal prosecution.

Dated: _____ _____
Signature

END OF SECTION

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Homer Central School District
88 South West Road
Homer, NY 13077

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:	_____	Signature:	_____
Name and Title:		Name and Title:	
Address:		Address:	

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 09:20:02 ET on 07/29/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Payment Bond, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

AIA® Document A132™ – 2019

Standard Form of Agreement Between Owner and Contractor, *Construction Manager as Adviser Edition*

AGREEMENT made as of the day of in the year
(In words, indicate day, month, and year.)

BETWEEN the Owner:
(Name, legal status, address, and other information)

Homer Central School District
88 South West Road
Homer, NY 13077

and the Contractor:
(Name, legal status, address, and other information)

for the following Project:
(Name, location, and detailed description)

Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

The Construction Manager:
(Name, legal status, address, and other information)

LeChase Construction Services
609 Erie Boulevard
Syracuse, NY 13204

The Architect:
(Name, legal status, address, and other information)

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845

The Owner and Contractor agree as follows.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract Documents include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals and addenda relating to bidding requirements. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents and reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[**X**] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

[ ] By the following date:

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.2.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.2.4 Unit prices, if any:
(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

Any work to be performed under a unit price is acknowledged to be a change in the Work and will require a Change Order based upon an agreement among the Owner, Construction Manager, Architect and Contractor. Compensation and final unit price costs for any such work shall be subject to negotiation and approval by the Owner through a Change Order prior to the work being performed.

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price
§ 4.3.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.3.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.3.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.3.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.3.5 Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rental rate paid at the place of the Project.

§ 4.3.6 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager, within 14 days of executing this Agreement, a written Control Estimate for the Owner's review and approval. The Control Estimate shall include the items in Section B.1 of Exhibit B, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price
§ 4.4.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.4.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

§ 4.4.3 The method of adjustment of the Contractor's Fee for changes in the Work:

§ 4.4.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

§ 4.4.5 Rental rates for Contractor-owned equipment shall not exceed percent (%) of the standard rental rate paid at the place of the Project.

§ 4.4.6 Unit Prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.4.7 Guaranteed Maximum Price
§ 4.4.7.1 The Contract Sum is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by Change Order as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

§ 4.4.7.2 Alternates
§ 4.4.7.2.1 Alternates, if any, included in the Guaranteed Maximum Price:

Item	Price

§ 4.4.7.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.4.7.3 Allowances, if any, included in the Guaranteed Maximum Price:
(Identify each allowance.)

Item	Price

§ 4.4.7.4 Assumptions, if any, upon which the Guaranteed Maximum Price is based:
(Identify each assumption.)

§ 4.4.8 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes, or equipment, all of which, if required, shall be incorporated by Change Order.

§ 4.4.9 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 4.4.7.4. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 4.4.7.4 and the revised Contract Documents.

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

§ 4.6 Other:
(Insert provisions for bonus, cost savings or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the ~~month, or as follows:~~

month

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the fifth day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the thirtieth day of the same month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

~~**§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price**~~

~~**§ 5.1.5.1** With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit B, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices, or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor, plus payrolls for the period covered by the present Application for Payment, less that portion of the payments attributable to the Contractor's Fee.~~

~~**§ 5.1.5.2** Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.~~

~~**§ 5.1.5.3** In accordance with AIA Document A232-2019 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:~~

~~**§ 5.1.5.3.1** The amount of each progress payment shall first include:~~

~~.1 The Cost of the Work as described in Exhibit B, Determination of the Cost of the Work;~~

~~.2 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and~~

~~.3 The Contractor's Fee computed upon the Cost of the Work described in the preceding Section 5.1.5.3.1.1 at the rate stated in Section 4.3.2; or if the Contractor's Fee is stated as a fixed sum in Section 4.3.2 an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work included in Section 5.1.5.3.1.1 bears to a reasonable estimate of the probable Cost of the Work upon its completion.~~

~~**§ 5.1.5.3.2** The amount of each progress payment shall then be reduced by:~~

~~.1 The aggregate of any amounts previously paid by the Owner;~~

~~.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;~~

~~.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;~~

~~.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019;~~

~~.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.5.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and~~

~~.6 Retainage withheld pursuant to Section 5.1.7.~~

~~**§ 5.1.5.4** The Owner, Construction Manager and Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.~~

~~**§ 5.1.5.5** In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor, and such action shall not be deemed to be a representation that (1) the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; (2) that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or (3) that the~~

Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.5.7 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232–2019.

§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price

§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

§ 5.1.6.2 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Guaranteed Maximum Price among: (1) the various portions of the Work; (2) any contingency for costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order; and (3) the Contractor's Fee.

§ 5.1.6.2.1 The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.6.2.2 The allocation of the Guaranteed Maximum Price under this Section 5.1.6.2 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.

§ 5.1.6.2.3 When the Contractor allocates costs from a contingency to another line item in the schedule of values, the Contractor shall submit supporting documentation to the Architect and Construction Manager.

§ 5.1.6.3 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work and for which the Contractor has made payment or intends to make payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 5.1.6.4 In accordance with AIA Document A232–2019, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.4.1 The amount of each progress payment shall first include:

.1 That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;

.2 That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and

.4 The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

~~**§ 5.1.6.4.2** The amount of each progress payment shall then be reduced by:~~

~~**.1** The aggregate of any amounts previously paid by the Owner;~~

~~**.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;~~

~~**.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;~~

~~**.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019;~~

~~**.5** The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and~~

~~**.6** Retainage withheld pursuant to Section 5.1.7.~~

~~**§ 5.1.6.5** The Owner and the Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.~~

~~**§ 5.1.6.6** In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and such action shall not be deemed to be a representation that (1) the Construction Manager or Architect have made a detailed examination, audit, or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; (2) that the Construction Manager or Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.~~

~~**§ 5.1.6.7** Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.~~

~~**§ 5.1.6.8** If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.~~

§ 5.1.4.4 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to reasonably rely on the accuracy and completeness of the information furnished by the Contractor and such action shall not be deemed to be a representation that (1) the Construction Manager or Architect have made a detailed examination, audit, or arithmetic verification of the documentation or other supporting data submitted by the Contractor; (2) that the Construction Manager or Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract.

§ 5.1.4.5 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five percent (5%) pursuant to NYS General Municipal Law Section 106-b upon the Contractor providing a performance bond and a labor and material bond in the amount of 100% of the anticipated final Contract Sum.

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

Not applicable.

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)

None

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted when the Work of this Contract is substantially complete shall not include retainage as follows:
(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)

Such reduction or limitation of retainage only to be effected upon agreement between the Owner and Contractor.

§ 5.2 Final Payment
§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum
§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

~~**§ 5.2.2 Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price**~~
~~**§ 5.2.2.1** Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when~~

~~**.1** the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;~~

~~**.2** the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit B, Determination of the Cost of the Work and a final Application for Payment; and~~

~~**.3** a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect in accordance with Exhibit B, Determination of the Cost of the Work.~~

~~**§ 5.2.2.2** The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:~~

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

2 % per annum simple interest.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document ~~A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.~~
~~*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*~~

A232–2019.

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Article 15 of AIA Document A232–2019.

[X] Litigation in a court of competent ~~jurisdiction.~~jurisdiction located in County where the project is located.

[ ] Other: *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.

§ 7.1.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

None

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019.

~~**§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price**~~
~~**§ 7.2.1 Termination**~~
~~**§ 7.2.1.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.~~

~~**§ 7.2.1.2 Termination by the Owner for Cause**~~
~~**§ 7.2.1.2.1** If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the Owner shall then only pay the Contractor an amount as follows:~~

~~**.1** Take the Cost of the Work incurred by the Contractor to the date of termination;~~
~~**.2** Add the Contractor's Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;~~

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A232–2019.

§ 7.2.1.2.2 When the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, if the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the amount, if any, to be paid to the Contractor under Article 14 of AIA Document A232–2019 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.1.2.1.

§ 7.2.1.2.3 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Contractor will contain provisions allowing for assignment to the Owner as described above.

§ 7.2.1.3 Termination by the Owner for Convenience

If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of or method for determining the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.A232–2019.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given ~~in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:~~

~~*(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)*~~

by email delivery to the recipient provided proof of delivery and/or receipt of the email can be provided upon demand.

§ 8.7 Relationship of the Parties

~~Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the~~ The Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

§ 8.8 Other provisions:

§ 8.8.1 This Agreement shall be governed by the laws of the State of New York.

§ 8.8.2 The Owner and Contractor, respectively, bind themselves, their agents, successors, assigns and legal representatives to this Agreement. Neither the Owner nor the Contractor shall assign this Agreement without the written consent of the other.

§ 8.8.3 Nothing contained in this Agreement shall create a contractual relationship with or a cause of action in favor of a third party against the Owner.

§ 8.8.4 Nothing contained in this Agreement shall be construed as creating any personal liability on the part of any officer, employee or agent of the Owner.

§ 8.8.5 Contractor agrees to comply with all New York State laws which may be applicable to this Agreement, and to require similar compliance from its subcontractors and consultants.

§ 8.8.6 Contractor, in accordance with its status as an independent contractor, covenants and agrees that it shall conduct itself in a manner consistent with such status, that it will neither hold itself nor its employees out as, nor claim to be an officer or employee of the Owner, and that it will not by reason hereof, make any claims, demand or application for any right or privilege applicable to an officer of employee of the Owner, including but not limited to workmen's compensation coverage, unemployment insurance benefits, Social Security coverage and retirement membership or credit.

§ 8.8.7 Contractor agrees to maintain sufficient on-site records and information necessary for the documentation of any and all facets of program operation specified by this Agreement. Contractor agrees to permit on-site inspection and auditing of all records, books, papers and documents associated with this Agreement by authorized representatives of the Owner, and further agrees to provide necessary staff support in the performance of such audit. Contractor agrees to maintain for a period of five (5) consecutive years following termination of this Agreement, any and all records, reports

and other documentation arising from the performance of this Agreement; however, this period shall be extended beyond five years for any and all records and information pertaining to unresolved questions which have been brought to Contractor's attention by written notice.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

.4 ~~AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:~~

~~(Insert the date of the E203-2013 incorporated into this Agreement.)~~Intentionally omitted

.5 Drawings

Number	**Title**	**Date**
Exhibit "C"		

.6 Specifications

Section	**Title**	**Date**	**Pages**
Exhibit "D"			

.7 Addenda, if any:

Number	**Date**	**Pages**

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

[ ] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:
(Insert the date of the E235-2019 incorporated into this Agreement.)

[ ] The Sustainability Plan:

Title	**Date**	**Pages**

[ ] Supplementary and other Conditions of the Contract:

Document	**Title**	**Date**	**Pages**

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement is entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:04:02 ET on 11/30/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A132™ – 2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

AIA® Document A132™ – 2019 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month, and year.)

for the following **PROJECT**:
(Name and location or address)

Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

THE OWNER:
(Name, legal status, and address)

Homer Central School District
88 South West Road
Homer, NY 13077

THE CONTRACTOR:
(Name, legal status, and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A232™–2019, General Conditions of the Contract for Construction. Article 11 of A232™–2019 contains additional insurance provisions

TABLE OF ARTICLES

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A232™–2019, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance
The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance
§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.1.1 The Insurance required by Section A.2.3.1 is not intended to cover the Contractor or Subcontractor against any loss by fire, lightning, extended coverage, all-risk, theft or vandalism and malicious mischief of any tools, equipment, vehicles, shanties, tool houses, trailers or other temporary or permanent structures, wherever located, and owned or rented by the Contractor, Subcontractor, their Employees or Agents.

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to false work and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's, Construction Manager's, and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures
If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.
The Owner shall purchase and maintain the insurance selected and described below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[ ] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

[ ] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

[ ] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

[ ] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

[ ] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

[ ] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

[ ] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.
The Owner shall purchase and maintain the insurance selected below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[ ] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

[ ] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	**Limits**

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS
§ A.3.1 General
§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.1.1 The submittal of the certificates of insurance shall include a disclosure of any prior and/or pending claims against the submitted policies, additionally, the Contractor shall immediately make known to the Owner, any subsequent claims against the aforementioned policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage
§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is ~~located.~~ located, and one to which the Owner has no reasonable objection. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than one million dollars ($ 1,000,000) each occurrence, two million dollars ($ 2,000,000) general aggregate, and two million dollars ($ 2,000,000) aggregate for products-completed operations hazard, providing coverage for claims including

- **.1** damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- **.2** personal injury and advertising injury;
- **.3** damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- **.4** bodily injury or property damage arising out of completed operations; and
- **.5** the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- **.1** Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- **.2** Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- **.3** Claims for bodily injury other than to employees of the insured.
- **.4** Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- **.5** Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- **.6** Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- **.7** Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- **.8** Claims related to roofing, if the Work involves roofing.
- **.9** Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- **.10** Claims related to earth subsidence or movement, where the Work involves such hazards.
- **.11** Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, or by employees of the Contractor, with policy limits of not less than one million dollars ($ 1,000,000) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation and Disability Insurance at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than one million dollars ($ 1,000,000) each accident, one million dollars ($ 1,000,000) each employee, and two million dollars ($ 2,000,000) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than two million dollars ($ 2,000,000) per claim and six million dollars ($ 6,000,000) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than one million dollars ($ 1,000,000) per claim and two million dollars ($ 2,000,000) in the aggregate.

~~**§ A.3.2.10** Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than ($) per claim and ($) in the aggregate.~~

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than ~~($) per claim and ($) in the aggregate.~~five million dollars ($ 5,000,000) per claim.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

Umbrella Liability to provide bodily injury and property damage insurance limits in excess of those limits shown herein, with policy limits of not less than five million dollars ($5,000,000) each occurrence and five million dollars ($5,000,000) in the aggregate, with a retained limit of ten thousand dollars ($10,000)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[ ] **§ A.3.3.2.1** If there is only one Contractor performing the Work on the Project, property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

[ ] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than ($) per claim and ($) in the aggregate, for Work within fifty (50) feet of railroad property.

[X] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than one million dollars ($ 1,000,000) per claim and two million dollars ($ 2,000,000) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing ~~materials.~~materials, if the work requires such activities.

[X] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[X] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[ ] **§ A.3.3.2.6 Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.4 Performance Bond and Payment Bond
The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	CONTRACT SUM
Performance Bond	CONTRACT SUM

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS
Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

AIA® Document A305™ – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY:
(Organization name and address.)

SUBMITTED TO:
(Organization name and address.)

TYPE OF WORK TYPICALLY PERFORMED
(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:
(Check all that apply.)

[ ] Exhibit A – General Information
[ ] Exhibit B – Financial and Performance Information
[ ] Exhibit C – Project-Specific Information
[ ] Exhibit D – Past Project Experience
[ ] Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION
The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

_____ _____
Organization's Authorized Representative Signature **Date**

_____
Printed Name and Title

NOTARY
State of:
County of:
Signed and sworn to before me this day of

_____
Notary Signature

My commission expires:

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 09:17:33 ET on 07/29/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A305™ – 2020, Contractor's Qualification Statement, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

AIA® Document A305™ – 2020 Exhibit A

General Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

§ A.1 ORGANIZATION
§ A.1.1 Name and Location
§ A.1.1.1 Identify the full legal name of your organization.

3hi2 l o0b7 , nt ha2 i7 portant
mgam0on2, qb, n0, 2eCon2bnta tion
" ith an attorn, y
i2 , n0obrag, l " ith r, 2p, 0t to
it2 0o7 pmtion or 7 ol iT0ationе

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

§ A.1.2 Legal Status
§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

.1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.

.2 If your organization is a partnership, identify its partners and its date of organization.

.3 If your organization is individually owned, identify its owner and date of organization.

.4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

§ A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

§ A.1.3.2 How many full-time employees work for your organization?

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

§ A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

§ A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

§ A.4 REFERENCES

§ A.4.1 Identify three client references:
(Insert name, organization, and contact information)

§ A.4.2 Identify three architect references:
(Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference:
(Insert name, organization, and contact information)

§ A.4.4 Identify three subcontractor or other trade references:
(Insert name, organization, and contact information)

AIA® Document A305™ – 2020 Exhibit B

Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

§ B.1 FINANCIAL
§ B.1.1 Federal tax identification number:

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.
(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS
§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than $75,000?
(If the answer is yes, provide an explanation.)

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 failed to complete work awarded to it?

.2 been terminated for any reason except for an owners' convenience?

.3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than $75,000?

.4 filed any lawsuits or requested arbitration regarding a construction project?

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

.2 had any business or professional license subjected to disciplinary action?

.3 been penalized or fined by a state or federal environmental agency?

AIA® Document A305™ – 2020 Exhibit C

Project Specific Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

PROJECT:
(Name and location or address.)

Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

CONTRACTOR'S PROJECT OFFICE:
(Identify the office out of which the contractor proposes to perform the work for the Project.)

TYPE OF WORK SOUGHT
(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

CONFLICT OF INTEREST
Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

§ C.1 PERFORMANCE OF THE WORK
§ C.1.1 When was the Contractor's Project Office established?

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office

location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

§ C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

§ C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

§ C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, or AIA Document A132-2019, Exhibit A, as applicable, Insurance A.3.2.2.2? If so, identify.

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

§ C.5.2 Surety company name:

§ C.5.3 Surety agent name and contact information:

§ C.5.4 Total bonding capacity:

§ C.5.5 Available bonding capacity as of the date of this qualification statement:

AIA® Document A305™ – 2020 Exhibit D

Contractor's Past Project Experience

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

AIA® Document A305™ – 2020 Exhibit E

Contractor's Past Project Experience, Continued

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)

PRODUCER	THIS CERTIFICATE ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
	INSURERS AFFORDING COVERAGE
INSURED	INSURER A:
	INSURER B:
	INSURER C:
	INSURER D:
	INSURER E:

COVERAGES

THE POLICES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INS LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXP DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY				FIRE DAMAGE (any 1 fire)	$
	☐ CLAIMS MADE ☐ OCCUR				MED EXP (any 1 person)	$
	☐ _____				PERSONAL & ADV INJURY	$
	☐ _____				GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:				PRODUCTS – COMP/OP AGG	$
	☐ POLICY ☐ PROJECT ☐ LOC					
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea Accident)	
	☒ ANY AUTO				BODILY INJURY (per person)	$
	☐ ALL OWNED AUTOS				BODILY INJURY (per accident)	$
	☐ SCHEDULED AUTOS				PROPERTY DAMAGE (Per accident)	$
	☒ HIRED AUTOS					
	☒ NON OWNED AUTOS					
	☐ _____					
	☐ _____					
	GARAGE LIABILITY				AUTO ONLY – EA ACCIDENT	$
	☐ ANY AUTO				OTHER THAN AUTO ONLY EA ACC	$
	☐ _____				AGG	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	☐ OCCUR ☐ CLAIMS MADE				AGGREGATE	$
						$
	☐ DEDUCTIBLE					$
	☐ RETENTION $_____					$
	WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY				☐ WC Statutory Limits ☐ Other	
					E.L. EACH ACCIDENT	$
					E.L. DISEASE –EA EMPLOYEE	$
					E.L. DISEASE –POLICY LIMIT	$
					•	

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS:

•

CERTIFICATE HOLDER **[N] ADDITIONAL INSURED; INSURER LETTER: _____** **CANCELLATION**

	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KINDUPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.
	AUTHORIZED REPRESENTATIVE

AIA® Document G715™ – 2017

Supplemental Attachment for ACORD Certificate of Insurance 25

PROJECT: *(name and address)* «Homer CSD - 2021 Capital Improvement Phase 1» «Homer Central School District» «88 South West Road» «Homer, NY 13077» «Hunt – 2503-036»	**CONTRACT INFORMATION:** Contract For: Date:	**CERTIFICATE INFORMATION:** Producer: Insured: Date:
OWNER: *(name and address)* «Homer Central School District» «88 South West Road» «Homer, NY 13077»	**ARCHITECT:** *(name and address)* « Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC» «Airport Corporate Park» «100 Hunt Center» «Horseheads, NY 14845»	**CONTRACTOR:** *(name and address)*

A. General Liability		**Yes**	**No**	**N/A**
1.	Does this policy include coverage for:			
a	Damages because of bodily injury, sickness, or disease, including occupational sickness or disease, and death of any person?	☐	☐	☐
b	Personal injury and advertising injury?	☐	☐	☐
c	Damages because of physical damage to or destruction of tangible property, including the loss of use of such property?	☐	☐	☐
d	Bodily injury or property damage arising out of completed operations?	☐	☐	☐
e	The Contractor's indemnity obligations included in the Contract Documents?	☐	☐	☐
2.	Does this policy contain an exclusion or restriction of coverage for:			
a	Claims by one insured against another insured, where the exclusion or restrictions is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim?	☐	☐	☐
b	Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor?	☐	☐	☐
c	Claims for bodily injury other than to employees of the insured?	☐	☐	☐
d	Claims for the Contractor's indemnity obligations included in the Contract Documents arising out of injury to employees of the insured?	☐	☐	☐
e	Claims for loss excluded under a prior work endorsement or other similar exclusionary language?	☐	☐	☐
f	Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language?	☐	☐	☐
g	Claims related to residential, multi-family, or other habitational projects?	☐	☐	☐
h	Claims related to roofing?	☐	☐	☐
i	Claims related to exterior insulation finish systems, synthetic stucco, or similar exterior coatings or surfaces?	☐	☐	☐
j	Claims related to earth subsistence or movement?	☐	☐	☐
k	Claims related to explosion, collapse, and underground hazards?	☐	☐	☐

B. Other Insurance Coverage		**Yes**	**No**	**N/A**
1.	Indicate whether the Contractor has the following insurance coverages and, if so, indicate the coverage limits for each.			

a	Professional liability insurance Coverage limits:	☐	☐	☐
b	Pollution liability insurance Coverage limits:	☐	☐	☐
c	Insurance for maritime liability risks associated with the operation of a vessel Coverage limits:	☐	☐	☐
d	Insurance for the use or operation of manned or unmanned aircraft Coverage limits:	☐	☐	☐
e	Property insurance Coverage limits:	☐	☐	☐
f	Railroad protective liability insurance Coverage limits:	☐	☐	☐
g	Asbestos abatement liability insurance Coverage limits:	☐	☐	☐
h	Insurance for physical damage to property while it is in storage and in transit to the construction site Coverage limits:	☐	☐	☐
i	Other:	☐	☐	☐

_____
(Authorized Representative)

_____
(Date of Issue)

AIA® Document A232™ – 2019

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

for the following PROJECT:
(Name, and location or address)

Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

LeChase Construction Services
609 Erie Boulevard
Syracuse, NY 13204

THE OWNER:
(Name, legal status, and address)

Homer Central School District
88 South West Road
Homer, NY 13077

THE ARCHITECT:
(Name, legal status, and address)

Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

TABLE OF ARTICLES

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. ~~Unless specifically enumerated in the Agreement, the Contract Documents do not~~ The Contract Documents include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or ~~proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal~~ proposals and addenda relating to bidding requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.11 Miscellaneous Definitions

§ 1.1.11.1 The term "Product" as used herein includes materials, systems and equipment.

§ 1.1.11.2 The terms "Install" or "Furnish all labor" are used herein as term contractions and unless specifically noted otherwise are to mean "perform all operations connected with installation of work including unloading materials to be installed, supplying all necessary equipment and rigs to do the work, test, place in operation and service.

§ 1.1.11.3 The terms "Furnish" or "Furnish all material" are used herein as term contractions and unless specifically noted otherwise are to mean "supply and deliver to the job site all materials and/or equipment so specified.

§ 1.1.11.4 The word "Provide" is used herein as a term contraction and unless otherwise specifically noted is to mean "furnish, install, connect up complete, test, place in operation and service.

§ 1.1.11.5 The terms "Approved", "Equal", "Proper" and "adequate" and words of similar meaning are understood to mean "in the opinion of the architect.

§ 1.1.11.6 The word "Replace" is used herein as a term contraction and unless otherwise specifically noted is to mean "remove existing and provide new.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 ~~The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor.~~ It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. The Contract Documents are complementary, and what is required by one shall be as binding as if required by ~~all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.~~all.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 Certain portions of the Specifications are written in condensed outline form and omitted words are to be supplied by inference. Naming of an article or operation shall have the effect of stating "Contractor shall furnish, install and complete" said operation or article unless it is further qualified in the context in which it appears.

§ 1.2.5 When reference is made to specifications of a manufacturer, trade association, governmental agency, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) such is made part of these Specifications, having the force and effect as though reproduced herein, and upon entering into the Contract the Contractor acknowledges his familiarity with those pertaining to his Work.

§ 1.2.6 Within the Contract Documents for which each Prime Contractor is responsible, any Work included by reference in any section to another Specification's Section shall be included as Work under the Contract, whether or not it is called for under the Section referred to. Failure to cross-reference such items shall not relieve the Contractor or any Prime Contractor from the obligations to provide such work.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.4.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

1. The Agreement..
2. Addenda, with those of later date having precedence over those of earlier date.
3. Supplementary Conditions.
4. The General Conditions of the Contract for Construction.
5. Drawings and Specifications.

In case of an inconsistency between Drawings and Specifications or within other Documents not clarified by addendum the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation. The Architect's determination shall be final.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. ~~The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.~~

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk

and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.1.3 The Owner shall not supervise, direct or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work. Owner will not be responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 ~~Prior to commencement of the Work, and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~Intentionally omitted.

§ 2.2.2 ~~Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.~~ Intentionally omitted.

§ 2.2.3 ~~After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~Intentionally omitted.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent

changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner ~~shall furnish surveys~~ may furnish information describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of ~~the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.~~the site. Locations of existing utilities shown on the plans have been taken from record drawings and are based upon the best available information. Actual field conditions may vary from the conditions shown on the plans and other Infrastructure not shown may exist near or within the area of work. In addition to the Contractor's obligations under Sections 3.19, 3.20 and 3.21, it is the Contractor's responsibility to determine the exact locations of all utilities prior to working in the area and to avoid interference.

§ 2.3.6 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.6 ACCELERATION CLAUSE

§ 2.6.1 The Owner reserves the right to accelerate the work of the Contract. In the event that the Owner directs acceleration, such directive will be only in written form. The Contractor shall keep cost and other project records related to the written acceleration directive separately from normal project costs and records and shall provide a written record of acceleration cost to the Owner on a daily basis.

§ 2.6.2 In order to recover additional costs due to a written acceleration directive, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will be only overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will be only the cost of added equipment mobilized to the site to accomplish the accelerated work effort.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect and Owner any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect or Owner may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. If the Contractor performs any construction activity which involves an error, inconsistency or omission in the Contract Documents without first providing notice to the Owner, Architect and Construction Manager of such condition and receiving authorization to proceed, the Contractor shall assume responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as

would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 Whenever the Drawings show existing or other construction not required as part of the Contract Work, it is understood that it is so shown as a matter of information and that the Owner, and Architect, while believing such information to be substantially correct, assumes no responsibility thereof.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 Where equipment lines, piping, conduit or any other systems are shown diagrammatically, the Contractor shall be responsible for the coordination and orderly arrangement of the various lines of piping, conduit, etc. included in the Work of its Contract. It shall coordinate the work of its Subcontractors and prevent all interferences between equipment, lines of piping, architectural features, etc. and avoid any unsightly arrangements in Work whether exposed or concealed. In the event there are other separate Contractors it shall also coordinate the Work of its Contract with the Work of any such separate Contractors.

§ 3.3.5 The Contractor, its employees and Subcontractors shall be subject to such rules and regulations for the conduct of the Work as the Owner may establish. The Contractor shall be responsible for the enforcement among his employees of the Owner's instructions.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.1.1 Contractor shall warrant that it has good title to all materials used by them as part of the Work of this Contract. No materials or supplies shall be purchased by Contractor or any of its Subcontractors that are subject to any chattel mortgage, conditional sale or other agreement by which an interest is retained by Seller.

§ 3.4.1.2 On receipt of a signed Contract, Contractor, whether directly or through its Subcontractors, Suppliers or Vendors, will be expected to place firm orders for needed materials in sufficient time to ensure delivery at such times as will ensure speedy and uninterrupted progress of the Work. Contractor shall not be entitled to an increase in the contract price or the contract time for the failure to do so. If deemed necessary to assure timely delivery of materials for the Project, Contractor

may accept delivery of such materials at any time with prior written approval of the Owner, and may include the cost of such materials in its applicable monthly application for payment, provided such materials have actually been delivered to Contractor and properly stored by him with approval or under direction of the Architect or Owner either at the job site or in an approved storage facility, as provided elsewhere in these General Conditions.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.3.1 Persons whose work is unsatisfactory to the Owner or Architect, or who is reasonably considered by them to be unskilled or otherwise objectionable, may be immediately dismissed from the Project site upon notice to the Contractor. Any persons so dismissed shall be immediately replaced by the Contractor so as not to delay the progress of the Work.

§ 3.4.4 After the Contract has been executed, the Owner and Architect will consider a formal request for the substitution of products in place of those specified in the Project Specifications. The Architect will be allowed a reasonable time within which to evaluate each proposed substitution. The burden of proof regarding the merit of a substitution is on the Contractor. The Architect will be the sole judge of equivalence, and no substitute will be ordered, installed or utilized without the Architect's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. Owner may require Contractor to furnish at the Contractor's expense a special performance guarantee or other surety with respect to any substitute. The Architect will record time required by the Architect and the Architect's consultants in evaluating substitutions proposed by Contractor and in making changes in the Contract Documents occasioned thereby. Whether or not the Architect accepts a proposed substitute, Contractor shall reimburse Owner for the charges of the Architect and Architect's Consultants for evaluating each proposed substitute.

§ 3.4.5 By making requests for substitutions based on Subparagraph 3.4.4 contained herein, the Contractor:

1. Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
2. Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
3. Certifies that the cost data presented is complete and includes all related costs under this Contract except the Architects redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
4. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

§ 3.4.6 If in the Project Specifications, two or more kinds, types, brands, manufacturers or materials are named, they are regarded as the required standard of quality, and are presumed to be equal. The Contractor may select one of these items or, if the Contractor desires to use any kind, type, brand, manufacturer or material other than those named in the Specification, he shall indicate in writing, when requested, and prior to award of contract, what kind, type, brand, manufacturer is included in the base bid for the specified item.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of Owner. If

required by Architect, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. ~~If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.~~

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

.1 Any and all warranties provided herein shall be assignable to any person or entity that succeeds Owner in the ownership of the premises.

§ 3.5.3 The Contractor shall warrant all materials and operating systems to be free from any defects and faulty equipment for a minimum period of one (1) year from either (a) the date the Architect/Owner recommends final payment or (b) where the performance of materials, systems, or equipment is a condition of the Contract Documents, from the date the materials, systems or equipment performs satisfactorily and the Architect certifies the same in writing to the Owner, whichever is later.

§ 3.5.4 The Contractor shall obtain and furnish to the Architect written manufacturer's warranties for all major materials, systems and equipment. The terms of the warranty shall be as individually specified in the Contract for the item; if no term is specified, the terms shall be a minimum of one year, but not less than the period of the manufacturer's warranty for the item§ 3.5.5 All warranties upon any Work, labor, materials, or equipment by any subcontractor or supplier of Contractor shall be deemed made by Contractor to Owner. All factory and manufacturers' warranties shall be assigned by Contractor to Owner and all such warranty documents shall be delivered by Contractor to Owner prior to final payment by Owner hereunder; provided, however, that no such assignment of factory or manufacturers' warranties shall release or relieve Contractor from any of its warranty obligations or liability hereunder. The provisions of this subparagraph shall survive Owner's final acceptance of the Project. Contractor shall obtain the manufacturer's warranty for the plumbing, electrical, HVAC and roof systems and components and for all structural components for the longest period available, and shall obtain consent to the assignment of the same to Owner; provided, however, if such extended warranty exceeds that required by the Contract Documents, Contractor shall notify Owner thereof and of any additional cost for such extended warranty and if Owner elects to obtain such extended warranty, such excess cost shall be paid by Owner. Contractor covenants to perform the Work in such a manner as to preserve any and all such warranties.

§ 3.5.6 Neither final payment nor any provision in the Contract Documents nor partial or entire occupancy of premises by Owner shall constitute an acceptance of work not done in accordance with Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

§ 3.5.7 Upon written notice from Architect, Contractor shall remedy any defects in the Work, and pay for any damage to other Work resulting therefrom, which shall appear within a period of one (1) year, unless longer period is specified, from date of final payment for completed Work, or acceptance of any major portion of building. It is understood that Owner will notify Architect of observed defects with reasonable promptness. Notwithstanding anything to the contrary herein contained, it is understood and agreed that the foregoing warranty shall not affect, limit or impair Owner's rights against Contractor with regard to latent defects in the Work which do not appear within the applicable warranty period and which could not, by the exercise of reasonable care and due diligence, be ascertained or discovered by Owner within such warranty period provided that all claims for latent defects shall be asserted within five (5) years after Substantial Completion. Contractor shall be and remain liable and responsible to correct and cure any such latent defects which are reported to Contractor by Owner in writing within ninety (90) days after any such latent defects first appear or could, by the exercise of reasonable care and due diligence, be ascertained or discovered by Owner. Notwithstanding anything to the contrary, if Contractor fails to promptly commence and diligently perform and complete all corrective Work required hereunder, Owner shall have the right (but not the obligation) in each instance, at Owner's election, to cause such corrective Work to be done by others and recover the costs thereof, together with damages and reasonable attorneys' fees, from Contractor, in addition to all other rights and remedies available to Owner against Contractor hereunder and at law and in equity for such default by Contractor.

§ 3.5.8 Should the Contractor be required to correct any defects or damage, under the provisions of this Article, it further agrees to make good, without cost to the Owner, and subsequent defects in the work or materials furnished or built; by them, or damage due to faulty workmanship or materials in the work furnished or built by them, which occur within a one-year period after the original defect or damage is corrected or replaced, but such additional warranty shall apply only to the actual facility, material or structure initially found to be defective or damaged.

§ 3.5.9 All related components of the work under this Contract not showing defects or damage within one year of the Date of Substantial Completion shall be exempt from the additional warranty, except that the original warranty on a related component shall be extended for a period of time corresponding to the period of non-use of such component if it cannot be used due to the condition of the defective work, and/or due to the repair or replacement of such work. When required by the Owner, the Contractor shall furnish a warranty bond in the amount of fifty percent (50%) of the full amount of the contract, or such lesser amount as the Owner may specify to cover the requirements of this paragraph, and such bond, if required, shall be posted by the Contractor prior to the expiration of the One Year Warranty Period.

§ 3.5.10 In emergencies occurring during the warranty period, the Owner may correct any defect immediately and charge the cost to the Contractor. The Owner shall at once notify the Contractor, who may take over the Work and make any corrections remaining after their forces arrive at the Work. Repair work not started within seven days following notice to the Contractor of any defect may be considered an emergency.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.1 The Owner is exempt from payment of FEDERAL, STATE, LOCAL, TAXES, and from payment of SALES AND COMPENSATING USE TAXES of the State of New York and of Cities and Counties on all materials and supplies sold to the Owner pursuant to the provisions of this Contract. These taxes are not to be included in bids. This exemption does not, however, apply to tools, machinery, equipment, or other property leased by, or to the Contractor or a subcontractor; and the Contractor and its subcontractor shall be responsible for, and pay, any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.1.1 If, in connection with the Project, the Owner has obtained certain permits, licenses, or agreements from State and Federal Agencies and adjacent property owners for the Project, the Owner will furnish copies of these permits to

the Contractor. It is the Contractor's responsibility to comply with any conditions or limitations placed on the Project by these permits. The Contractor shall fully cooperate with Owner in meeting the permit requirements and accommodations of regulatory inspections/directives.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the ~~Work.~~Work, except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Architect shall be responsible for monitoring Contractor's compliance with any Laws or Regulation.

§ 3.7.2.1 Owner will not be responsible for contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. ~~If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.~~
Contractor agrees that before making his proposal he carefully examined the Contract Documents, together with the site of the proposed work, as well as its surrounding territory, is fully informed regarding all of the conditions affecting the work to be done and labor and materials to be furnished for the completion of this contract, including the existence of poles, wires, pipes and other facilities and structures of municipal and other public service corporations on, over or under the site, and that this information was secured by personal investigation and research, and that he will make no claim by reason of estimates, tests or representations of the Owner.

The Contractor shall refer to the reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which have been relied upon in preparation of the Contract Documents. Such reports are not guaranteed as to accuracy or completeness. The Contractor shall not be entitled to an increase in the contract price or an extension of contract time because of inaccuracy or incompleteness of reports on or tests of subsurface and latent physical conditions.

In addition to showing the structures to be built under these Contract Documents, the Drawings may show certain information obtained by the Owner regarding the conduits, pipe-lines, existing pavements, concrete slabs and rock, and other structures which exist at the Site of the Work, both at and below the surface of the ground. The Owner expressly disclaims any responsibility for the accuracy or completeness of the information given on the Drawings with regard to existing structures, conduits, pipe-lines, existing pavements, concrete slabs and rock, and the Contractor will not be entitled to an increase in the contract price or an extension of contract time on account of inaccuracy or incompleteness of such information. Said structures, conduits, pipe-lines, existing pavements, concrete slabs and rock, are being shown only for convenience

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed

by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, labor and installation costs, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, ~~labor, installation costs,~~ overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without prior written notification to the Architect and Owner at least 30 days prior to the proposed date of change, and without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. ~~The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.~~ Any modifications to the Construction Schedule must be agreed to by the Contractor and Owner and contained in a Change Order signed by the Contractor and Owner. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.1.1 If the Contractor neglects to carry out the Work in accordance with the Construction Schedule or progress of the Work indicates it will not timely achieve Substantial Completion of the Work, the Owner shall have the right to direct the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation: (1) working additional shifts or overtime; (2) supplying additional manpower, equipment, facilities; (3) rescheduling activities, and; (4) any other similar measures (hereinafter referred to collectively as "Recovery

Measures"). Such Recovery Measures shall continue until the progress of the Work complies with the state of completion required by the Construction Schedule. The Owner's right to require Recovery Measures is for the purpose of ensuring the Contractor's compliance with the Construction Schedule.

.1 Contractor shall not be entitled to seek and adjustment in the Contract Sum or Contract Time in connection with any Recovery Measures required by the Owner.

.2 Notwithstanding the above, if the Owner determines that the Contractor is behind the Construction Schedule, the Owner may alternatively give the Contractor ten (10) days to take whatever Recovery Measures are necessary to return the Work to adherence to the Construction Schedule. Contractor shall not be entitled to seek and adjustment in the Contract Sum or Contract Time for any such Recovery Measures. After such ten (10) day period, if the Owner determines that the Work is still behind the Construction Schedule, and Contractor fails to initiate the cure and fails to continue to progress with the cure of correcting the deficiency to the satisfaction of the Owner, the Owner may terminate the Contract without any further notice required under General Conditions Article 14 or correct the deficiency at the Contractor's expense.

.3 Owner may exercise the rights furnished to the Owner under or pursuant to this Subparagraph 3.10.1.3 as frequently as is reasonably necessary to ensure that the Contractor's performance of the Work will comply with any milestone date or completion date set forth in the Construction Schedule.

§ 3.10.1.2 The Contractor is solely responsible for the timing, sequencing coordination, and supervision of the work in accordance with the Construction Schedule. Review or approval of the initial Construction Schedule and subsequent reviews of the Construction Schedule by the Architect, Construction Manager and Owner do not operate to imply agreement by the Architect, Construction Manager or Owner that the means and methods of planning of the Work utilized by the Contractor are adequate or will accomplish the Work in the time shown on the Construction Schedule. The Contractor shall take all actions necessary to ensure the Work's successful planning and execution within the stipulated Contract Time. Additionally, review or approval of the Construction Schedule by the Owner or its consultants shall not make the Owner or its consultants responsible for Contractor's scheduling obligations or the accuracy of the Construction Schedule prepared by the Contractor.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.10.5 Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor.

§ 3.11 Documents and Samples at the Site

~~The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.~~**§ 3.11.1** The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good

order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 Contractor shall provide a set of reproducible record drawings showing significant changes in the Work made during construction based on marked-up prints, Drawings and other data including, but not limited to location of water, sewer, telephone, electric, gas and any other utility lines as they relate to the Project. If the Contractor fails to provide such drawings, the Architect shall do so as an additional service and the Contractor will be required to pay the costs of the Architect providing such service.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect. Any portion of the Work performed prior to review and approval by the Construction Manager and Architect of required Shop Drawings, Product Data, Samples, or other Submittals, is performed at Contractor's risk. No Contract adjustments will be made to correct or modify Work installed without prior written approval of the Construction Manager and Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been

issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.8.1 Or-equal: If in Architect's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Architect as an "or-equal" item, in which case review and approval of the proposed item may, in Architect's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

§ 3.12.8.2 Substitute Items: If in Architect's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under subparagraph 3.12.8.1, it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Architect to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute thereof. The procedure for review by the Architect will include the following as supplemented in the General Requirements. and as Architect may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by Architect from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to Architect for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by Architect in evaluating the proposed substitute. Architect may require Contractor to furnish additional data about the proposed substitute.

§ 3.12.8.3 Contractor's Expense: All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to reasonably rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, licensed in the State in which the project is located, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this

Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.11 The review of the shop drawings, product data and samples is an obligation of the Architect as described in subparagraph 4.2.11 of these General Conditions. The normal cost of the Architect's review is included in the Owner Architect agreement. Normal cost is hereby defined as the cost necessary to perform the original review of each shop drawing, product data, or sample and the review of one resubmittal for providing incidental information not included in the initial submission. The cost of additional review(s) or a substantial resubmittal as compared to incidental information will be the responsibility of the Contractor and the Contractor shall reimburse the Owner for any such costs charged by the Architect.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction

Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent by permitted by law, the Contractor shall indemnify and hold harmless the Owner, ~~Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable,~~ Owner's consultants, Architect, Architect's consultants, Construction Manager and Construction Manager's consultants, and each of their respective representatives, employees, directors, officers, and agents, from and against any and all claims, suits, actions, debts, damages, fines, penalties, costs, charges and expenses, including attorneys' fees and court costs, arising out of, relating to or resulting from the Work, including, but not limited to, bodily injury and/or property damage, to the extent caused, in whole or in part, by acts, actions, omissions, negligence, fault or breach of the Contractor, its employees, agents, subcontractors, suppliers and/or materialmen, regardless of whether or not such ~~claim, damage, loss, or expense~~ claim is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.1.1 The Contractor agrees to include the following indemnity provision in each and every contract it enters into with a subcontractor, and to require that subcontractor to include such provision in each contract it enters into with any lower tier subcontractor: "To the fullest extent permitted by law, Subcontractor shall indemnify and hold harmless the Contractor, Owner, Owner's consultant's, Architect, Architect's consultants, Construction Manager and Construction Manager's consultants, and each of their respective representatives, employees, directors, officers, and agents, from and against any and all claims, suits, actions, debts, damages, fines, penalties, costs, charges and expenses, including attorneys' fees and court costs, arising out of, relating to or resulting from the performance of this Subcontract, including, but not limited to, bodily injury or property damage, to the extent caused, in whole or in part, by acts, actions, omissions, negligence, fault or breach of the Subcontractor, its employees, agents, subcontractors, suppliers or materialmen, regardless of whether or not such claim is caused in part by a party indemnified hereunder.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.19 SITE CONDITIONS INVESTIGATED

§ 3.19.1 The Contractor acknowledges it has satisfied itself as to the nature and location of the Work, the general and local conditions, particularly those bearing on transportation, disposal, handling and storage of materials, availability of labor, materials, equipment, utilities, roads, weather, ground water table, character of surface and subsurface materials and conditions, the facilities needed to prosecute the Work, and all other factors which in any way affect the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint itself with the available information concerning these conditions will not relieve it from the responsibility of successfully performing work and the Contractor shall make no claim against the Owner or Architect with respect to the same.

§ 3.20 EXISTING FEATURES AND UNDERGROUND DATA

§ 3.20.1 The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures, and shall not be entitled to any extra payment due to any unforeseen difficulties or distances encountered in the Work.

§ 3.20.2 The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. The information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall make no claim against the Owner or Architect with respect to the accuracy or completeness of such information if it is erroneous, or if the conditions found at the time of construction are different from those as indicated.

§ 3.21 CONSTRUCTION STRESSES

§ 3.21.1 The Contractor shall be solely responsible for the conditions which develop during construction, as a result of its activities and in the event any structure is dislocated, over strained, or damaged so as to affect is usefulness, the Contractor shall be solely responsible. The Contractor shall take whatever steps necessary to strengthen, relocate or rebuild the structure to meet requirements.

§ 3.21.2 The Contractor is responsible for restoration and/or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities under this Agreement.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the

Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications. The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of

any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Construction Manager in consultation with the Architect will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.20 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

§ 4.2.22 If the Architect provides any additional services as part of the Construction Phase Services under its agreement with Owner after the date the project has been certified substantially complete by the Architect as a result of the Contractor's acts or omissions, any payments by the Owner to the Architect for such additional services shall be the responsibility of, and may be back-charged to the Contractor.

§ 4.2.23 If the Architect provides any additional services for replacement work as a result of a negligent or intentional act or omission of a Contractor, the Architect's costs in connection with the same shall be back-charged to the Contractor on behalf of the Owner.

§ 4.2.24 If the Architect provides any additional services for reviews of Shop Drawing, Product Data items, sample sand similar submittals of the Contractor, project site visits, or inspections as a result of a negligent or intentional act or omission of a Contractor, the Architect's costs in connection with the same shall be back-charged to the Contractor on behalf of the Owner.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 The Contractor shall not be entitled to receive any additional compensation or extension of time for changes in the work, regardless of whether such changes were ordered by the Owner or Architect, unless a written Change Order for such changes in the work has been issued in writing by the Owner. If the Contractor performed a change in the work without receipt of a written Change Order, the Contractor shall be deemed to have waived any claim for any additional compensation or extension of time for changes in the work.

§ 7.1.5 In no case shall the Contractor delay the progress of the Work, or any part thereof, in response to changes in the Work or disputes caused by proposed or ordered changes in the Work, or any disputes or disagreements as to equitable value of the changes.

§ 7.2 Change Orders

~~A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:~~**§ 7.2.1** A Change Order is a written instrument prepared by the Construction Manager in consultation with the Architect and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associates with such change and any and all adjustments to the Contract Sum and the construction schedule.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager in consultation with the Architect and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the

Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon;

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;

.2 Costs of materials, ~~supplies, and equipment, including cost of transportation, whether incorporated or consumed;~~exclusive of drill bits, saw blades, manual and power hand tools, whether incorporated or consumed; and exclusive of trucking and delivery costs including drivers time;

.3 Rental costs of heavy machinery and equipment, exclusive of manual and power hand tools, whether rented from the Contractor or others; Cost shall not be allowed in excess of usual rentals charged in area for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on site is required for change in work only, cost of transporting equipment to and from site will be allowed;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager in consultation with the Architect shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 If any material previously required is omitted by written order of the Owner after it has been delivered to, or partially worked on by the Contractor, and consequently will not retain its full value for other uses, Contractor shall be allowed actual cost of omitted material, less fair market value of material, as determined by Architect.

§ 7.3.12 The allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, maximum 15 percent of the direct cost.

.2 For the Contractor, for Work performed by the Contractor's Subcontractor, maximum 7 percent of the amount due the Subcontractor.

.3 For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, maximum 15 percent of the direct cost.

.4 For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors, maximum 5 percent of the amount due the Sub-subcontractor.

.5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.8.

.6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

§ 7.3.13 Cost shall not be allowed in excess of usual rentals charged in area for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on site is required for change in work only, cost of transporting equipment to and from site will be allowed.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the ~~Work.~~Work and to complete the Work so that it is ready for Final payment as evidenced by the Architect.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work. Contractor shall be responsible for all direct and consequential damages to Owner and Architect arising from any delay of Contractor, its Subcontractors and suppliers, in performing or completing the Work in accordance with the time requirements of paragraph 8.2. The indemnity provisions of Article 3 and 11 are applicable to such damages and to claims arising in respect thereto.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.4 In no case shall the Contractor delay the progress of the Work, or any part thereof, in response to changes in the Work or disputes caused by proposed or ordered changes in the Work, or any disputes or disagreements as to equitable value of the changes.

§ 8.2.5 If the Contractor does not achieve Substantial Completion within the Contract Time, The Contractor shall reimburse the Owner for all payments made to the Architect and the Construction Manager for services rendered by either of them required as a result of such failure by the Contractor.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.1.1 It is acknowledged that any delay, inefficiencies or additional costs that may result from the COVID pandemic or any New York State or National State of Emergencies, workplace reduction orders or workplace safety requirements resulting from the COVID disease are reasonably foreseeable when entering the Agreement and shall not be considered an unusual delay, unavoidable casualty or other cause beyond the Contractor's control (collectively the "COVID Delay"). The Contractor shall not be entitled to an increase in the contract price or an extension of contract time because of any COVID Delay.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 ~~This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.~~Notwithstanding anything to the contrary in the Contract Documents, an extension of the Contract Time, to the extent permitted under Paragraph 8.3.1 shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity; or (4) any delay-related claim (collectively referred in this subparagraph 8.3.3 as "Delay") whether or not such Delay is foreseeable. In no event shall the Contractor be entitled to any compensation or recovery of any damages, in connection with any Delay, including, without limitation, consequential damages, lost opportunity cost, impact damages, labor inefficiency damages, or overhead costs.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.2.1 Procedures required by Owner shall include, but are not necessarily limited to, submission by the Contractor to the Architect of bills of sale and bills of lading for such materials and equipment, provision of opportunity for Architect's visual verification that such materials and equipment are in fact in storage, and, if stored off-site, submission by the Contractor of verification that such materials and equipment are stored in a bonded warehouse.

§ 9.3.2.2 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.3.4 Along with its Application for Payment, Contractor shall submit to Architect a written acknowledgement of payment and waiver of lien rights with respect to the Application for Payment submitted. Contractor shall also submit acknowledgments of payment and waiver of lien rights from each of its Subcontractors for the time period through and including the Application for Payment being submitted the Contractor. Architect shall hold all acknowledgments of payment and waiver of lien rights in escrow until the applicable payment has been made by the Owner.

§ 9.3.5 Along with its Application for Payment, Contractor shall submit to Architect its certified payroll records.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's

certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor or other Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.7.1 If, after expiration of the applicable notice and cure period, the Owner must correct deficient work, settle mechanic's or construction liens, pursue the Contractor's indemnification obligation, or purchase additional insurance on behalf of the Contractor, the Owner shall have the right to be reimbursed by the Contractor, including all costs and reasonable attorney's fees.

§ 9.8 Substantial Completion

§ 9.8.1 ~~Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof~~ The Date of Substantial Completion of the Project or a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize ~~the Work for its intended use.~~the . entire Project (or such portion thereof as Owner earlier elects to occupy or utilize) for the use for

which it is intended. Substantial Completion shall not be deemed to exist until the Owner receives a Certificate of Occupancy for the Project (or such portion as elected by Owner), and the Contractor, Architect and Owner have agreed upon a schedule to provide the Owner with all as built drawings, operating manuals and warranties. Warranties called for by the Agreement or by the Drawings and Specifications shall commence on the date of Substantial Completion of the Project or designated portion thereof, or any later date that the parties agree. This date shall be established by a Certificate of Substantial Completion signed by the Owner, Architect and Contractor Contractor and shall state their respective responsibilities for security, maintenance, utilities, damage to the Work and insurance. This Certificate shall also list the items to be completed or corrected together with a price for each time and a time for their completion and correction.

§ 9.8.1.1 Commissioning. Contractor shall provide all services necessary for the functional testing and certification of all building systems, utility systems and equipment. All forms and documentation which record the certification and performance of the building systems, utility systems and equipment shall be fully executed and provided to the Owner and Architect as required by the plans and specifications.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Owner shall have the right to exclude Contractor from the Work after the date of Substantial Completion, but Owner shall allow Contractor reasonable access to complete or correct items on the tentative list.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager in consultation with the Architect will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the

Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. Construction Manager and Architect will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 If the Architect is required to perform additional final inspections because the Work fails to comply with the certifications of the Contractor identified in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the final payment to the Contractor.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees. Upon demand by the Owner, Contractor shall provide and file bond for discharge of any lien, as required by Lien Law, State of New York, Section 21, Paragraph 5.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the

Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment. Owner has the right to demand such waiver in writing from Contractor as a condition to making final payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
- **.4** construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor is expressly obligated to protect the adjacent property and its improvements from damage.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be

liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 Contractor shall comply with all the New York State, Federal and U.S. Department of Labor Occupational Safety and Health Administration (OSHA) laws, rules, order and regulations regarding COVID workplace safety and related return to work requirements applicable to the Contractor, including, but not limited to, recommended social distancing, use of personal protective equipment ("PPE"), workplace sanitization, workplace safety plans and the submission of any government required affirmations regarding COVID workplace safety measures.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work and take reasonable precautions to avoid further contamination or the spread or disturbance of the potentially hazardous substance or material in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of

the Contractor's fault or negligence in the use and handling of such materials or substances. Unless required by the Contract Documents, the Contractor shall not be required to perform without its consent, any Work relating to a hazardous material or substance, provided that such Contractor consent shall not be unreasonably withheld.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is ~~located.~~ located, and one to which the Owner has no reasonable objection. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.1.5 Where the Contract or Subcontract involves asbestos, the insurance required under the Contract Documents shall specifically include the words asbestos abatement work and shall specify any limitations on completed operation time period. If there is a limitation it will be at the Owner's discretion to accept or reject that limitation.

§ 11.1.6 Insurance must remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing or replacing defective Work.

§ 11.1.7 The submittal of the Certificates of Insurance shall include a disclosure of any prior and/or pending claims against the submitted policies. In addition, the Contractor shall immediately make known to the Owner, any subsequent claims against the aforementioned policies.

§ 11.1.8 Contractor shall provide Owner with performance and labor and material payment bonds guarantying faithful performance of the Contract and payment of obligations arising thereunder from an acceptable surety company in the penal sum of 100% of the Contract Sum.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 ~~Failure to Purchase Required Property Insurance.~~ ~~If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~ Intentionally omitted.

§ 11.2.3 ~~Notice of Cancellation or Expiration of Owner's Required Property Insurance.~~ ~~Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.~~ Intentionally omitted.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in

accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. ~~The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.~~

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall ~~deposit the insurance proceeds in a separate account and~~ make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to ~~the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a~~

~~written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.~~ Contractor's obligations under Section 3.5, Contractor warrants that the materials, goods and services it provides shall strictly conform to the Contract documents and meet all design requirements of the Project. Contractor further warrants that the installation of any and all materials and goods shall comply with manufacturers' requirements. In the event Owner seeks to enforce a claim based upon a manufacturers' warranty and should such manufacturer then fail to honor its warranty based, in whole or in part, on a claim of defective installation, Owner shall be entitled to enforce the warranty against Contractor in accordance with the terms of the manufacturer's warranty, except that a claim of defective installation shall not be a defense to any such claim. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The ~~one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.~~warranties set forth in Article 12 shall extend for a period of one year after the date of Substantial Completion of the Work or by the terms of any special warranty required by the Contract Documents, whichever time period is greater (the "Correction of Work Period"). The Correction of Work Period with respect to any Work that is repaired, replaced, modified or otherwise altered after Substantial Completion shall extend for a period of one year from the date of completion of such repair, replacement, modification, correction or alteration.

§ 12.2.2.3 ~~The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.~~Contractor shall, at its sole expense, repair, replace, modify, correct or alter any Work that does not comply with the Contract Documents within the Correction of Work Period, provided that Owner gives notice to Contractor within a reasonable period of time after discovery of Work that is defective, deficient or otherwise does not comply with the Contract Documents.

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 If Contractor fails to cure any breach of warranty, Owner may, at its option, perform such cure itself or another source and Contractor shall reimburse Owner for all costs incurred by Owner. All such work shall be warranted by Contractor as provided in Section 12.2.2.1, or, at Owner's option, Contractor shall reimburse Owner for its cost in obtaining equivalent warranty coverage from third-parties performing the work.

§ 12.2.7 In case of emergencies occurring during the Warranty Period, the Owner may correct any defect immediately and charge the cost to the Contractor. The Owner shall at once notify the Contractor, who may take over the Work and make any corrections remaining after its forces arrive on site. Repair work not started within seven days following notice to the Contractor of any defect may be considered an emergency.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

§ 12.3.1 If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Architect's recommendation of final payment, also Architects) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Architect as to reasonableness). If any such acceptance occurs prior to Architect's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

~~The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~**§ 13.1.1** The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.1.2 Each and every provision required by law to be made a part of this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though all such provisions were included herein. Upon request of either party, this Contract shall be physically amended to properly show each such provision found not inserted or found incorrectly inserted.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become

requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 Any materials to be furnished shall be subject to inspections and tests in the shop and field by the Architect. Shop inspection shall not relieve the Contractor of the responsibility to furnish satisfactory materials, and the right is reserved to reject any material at any time before final acceptance of the Work, when in the opinion of the Architect the materials and workmanship do not conform to the Specification requirements.

§ 13.4.8 Test specimens will be submitted to an independent laboratory designated by the Architect. Test data will be furnished to the Contractor by the Architect.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.6 CONTRACT DEEMED EXECUTORY

§ 13.6.1 The Contractor agrees that the Contract shall be deemed executory to the extent of the monies available and that no liability shall be incurred by the Owner beyond the monies available therefor. The Contractor is entitled to request of the Owner documentation sufficient to evidence appropriate financing of the Project.

§ 13.7 USE OR OCCUPANCY OF BUILDING BY OWNER

§ 13.7.1 Contractors shall cooperate with Owner in order to make portions of project available as soon as possible.

§ 13.7.2 Site and building, whether work of various Contractors is partially or fully completed or not, is property of Owner who shall have certain rights and privileges in connection with use of same, including the following:

.1 Should there be, in the opinion of the Architect, unwarranted delay on the part of any Contractor in completion of incomplete or defective Work or other Contract requirements, and Architect so certifies, Owner may have full or partial use and occupancy of any or all portions of buildings as required for moving in or installing furniture, fixtures, supplies, or equipment and for general cleaning and maintenance work. In such event, Contractor whose unfinished Work is performed subsequent to installation of furniture, fixtures, equipment, etc., shall be responsible for the prevention of any damage to such installation. Such use or occupancy by Owner shall in no instance constitute acceptance of any portion of the Work.

§ 13.8 MINIMUM RATE OF WAGE AND SUPPLEMENT

§ 13.8.1 The minimum hourly wage rates (including supplements) to be paid shall not be less than that designated by the New York State Department of Labor, Bureau of Public Works and any redetermination of the prevailing rate of wages after the Contract is approved shall be deemed to be incorporated herein by reference as of the effective date of redetermination and shall form a part of these Contract Documents.

§ 13.9 Assignment of Public Contracts

§ 13.9.1 As provided in Section 109 of the General Municipal Law, the Contractor is prohibited from assigning, transferring, conveying, subletting or otherwise disposing of the Contract, or of Contractors right title, or interest therein, or his power to execute such contract to any other person or corporation without the previous consent in writing of the officer, board or agency awarding the contract.

§ 13.9.2 If any contractor, to whom any contract is let, granted and awarded, as required by law, by any officer, board or agency in a political subdivision, or of any district therein, shall without the previous written consent specified herein, assign, transfer, convey, sublet or otherwise dispose of such contract, or his right, title or interest therein, or his power to execute such contract, to any other person or corporation, the officer, board or agency which let, made, granted, or awarded such contract shall revoke and annul such contract, and the political subdivision or district therein, as the case may be, and such officer, board or agency shall be relieved and discharged form any and all liability and obligations growing out of such contract to such contractor, and to the person or corporation to which such contract shall have been assigned, transferred, conveyed, sublet or otherwise disposed of, and such contractor, and his assignees, transferees or sublessees shall forfeit and lose all moneys, theretofore earned under such contract, except so much as may be required to pay his employees. The provisions of this section shall not hinder, prevent, or affect an assignment by any such contractor for the benefit of his creditors made pursuant to the laws of this state.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; or

.3 ~~Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or~~

.4 ~~The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~If, through no fault of the Contractor, the Owner has not made payment on a Certificate for Payment within sixty (60) days of certification of payment by the Architect, but only where the Owner or Construction Manager has not given notice to the Contractor that it is withholding payment to such

extent as may be necessary in the Owner's opinion to protect the Owner from a loss for which the Contractor is responsible for Work not performed in accordance with Contract Documents, including, but not limited to, all acts and omissions described in Section 9.5.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon ~~seven days'~~ thirty (30) days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work ~~executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.~~performed up to the date of termination a; but Contractor shall make no Claim nor seek to recover overhead, lost anticipated profit or damages in contract for Work not performed by Contractor.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.1.5 The Contractor's right to terminate and/or suspend the Contract under Section 14.1 shall not include or be applicable to any COVID Delay or other claimed delay, inefficiencies or contract suspension that may result from the COVID pandemic or any New York State or National State of Emergencies, workplace reduction orders or workplace safety requirements resulting from the COVID disease.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction ~~Manager,~~ Manager and Architect, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the

Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section ~~14.3.1. Adjustment of the Contract Sum shall include profit. No~~ 14.3.1.No adjustment shall be made to the extent:

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In the case of such termination for the Owner's convenience, the ~~Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.~~Contractor shall be entitled to receive payment for Work performed up to the date of termination.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

~~The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive~~ Claims by either the Owner or the Contractor must be initiated by written notice to the other party and the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is earlier. Claims by the Owner must be initiated within a reasonable time after occurrence of the event giving rise to such claim or after the Owner recognizes the condition giving rise to the Claim. The Contractor waives all Claims and causes of action not commenced in accordance with this ~~Section 15.1.2.~~Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or ~~Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by~~ the Contractor must be initiated by written notice to the other party and ~~to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall~~ the Initial Decision Maker. Claims by the Contractor must be initiated within 21

days after occurrence of the event giving rise to such Claim or within 21 days after the ~~claimant~~ Contractor first recognizes the condition giving rise to the Claim, whichever is ~~later.~~earlier. Claims by the Owner must be initiated within a reasonable time after occurrence of the event giving rise to such claim or after the Owner recognizes the condition giving rise to the Claim. The Contractor waives all Claims and causes of action not commenced in accordance with this Section 15.1.3.

§ 15.1.3.2 ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.~~Intentionally omitted.

§ 15.1.3.3 All written claims for damages or extra work shall include time of occurrence, location and other identifying factors and shall be supported if so required by Architect, by letters, journals, or diaries, instructions, vouchers, or other pertinent or applicable records.

§ 15.1.3.4 Owner shall not be liable to any Contractor or Subcontractor for damages caused by any breach of Contract, delay in performance or other act of neglect by other Contractors or Subcontractors having Contracts for performance of any portion of work.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 ~~The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.~~Intentionally omitted.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor ~~and Owner waive~~ waives Claims against Owner each other for consequential damages arising out of or relating to this Contract. This ~~mutual waiver includes~~ waiver includes, but is not limited to:

- **.1** damages incurred by the ~~Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and~~ Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, rental expenses, lost opportunities, for loss of management or employee productivity or of the services of such ~~persons; and~~
- **.2** ~~damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.~~persons, and for loss of profit. .

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests ~~a party~~ the Contractor to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part. The Contractor shall be deemed to have waived its Claim and related causes of action if it fails to furnish, or confirm the lack of the existence, of any additional supporting data requested by the Initial Decision Maker.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 ~~Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.~~ Intentionally omitted.

§ 15.2.6.1 ~~Either party~~ Owner may, within 30 days from the date of receipt of an initial decision, demand in writing that the ~~other party~~ Contractor file for mediation. If such a demand is made and the ~~party receiving the demand~~ Contractor fails to file for mediation within 30 days ~~of~~ after receipt thereof, then ~~both parties waive their rights~~ Contractor waives its right to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 All Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation ~~as a condition precedent to binding~~

~~dispute resolution.~~at the sole discretion of the Owner. Upon the Contractor's notice of mediation, the Owner shall have 30 days to elect that the Claims, disputes, or other matters in controversy noticed in the mediation demand not be subject to mediation as a precondition for the commencement of litigation. The Owner shall have no obligation to pay for and will not be responsible for any share of the mediator's fee and/or any filing fees for the mediation if the Owner elects to not proceed with the mediation as provided in this Section.

§ 15.3.2 ~~The~~ Subject to Section 15.3.1, the parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 ~~Either~~ Subject to Section 15.3.1, either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 ~~The~~ Subject to Section 15.3.1, the parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

~~**§ 15.4 Arbitration**~~

~~**§ 15.4.1** If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

~~**§ 15.4.1.1** A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~

~~**§ 15.4.2** The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

~~**§ 15.4.3** The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

~~**§ 15.4.4 Consolidation or Joinder**~~

~~**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

ARTICLE 16 SPECIAL CONDITIONS

§ 16.1 Equal Opportunity

~~**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

§ 16.1.1 The Contractor shall maintain policies for equal employment opportunity for construction employment. During performance of the Agreement, the Contractor agrees as follows below.

§ 16.1.2 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to insure that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship and on-the-job training.

§ 16.1.3 The Contractor will post and keep posted in conspicuous places, for employees and applicants for employment, notices obtained by the Contractor from the New York State Division of Human Rights as set forth in the General Regulations of that Division at 9 NYCRR 466.1(a), such conspicuous places to be as defined in 9 NYCRR 466.1(b), and such other postings as that Division may require with respect to New York State's laws, codes, rules, and regulations governing discrimination in employment.

§ 16.1.4 The Contractor will state in all solicitations or advertisements for employees placed by, or on behalf, of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color or national origin.

ARTICLE 17 NEW YORK STATE LABOR LAW REQUIREMENTS

§ 17.1 WORKING HOURS

§ 17.1.1 The Contractor specifically agrees to comply with the requirements of the New York State Labor Law ("Labor Law"), Sections 220 and 220-d, as amended, including, but not limited to, the requirements that:

1. No laborer, worker, or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or any part of the work included in the Contract Documents shall be permitted or required to work more than eight hours in any one calendar day or more than five (5) days in any one week, except to the extent permitted in the case of extraordinary emergencies described in the Labor Law.

2. The wages to be paid to each laborer, worker, or mechanic in the employ of the Contractor, Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents for a legal day's work shall be not less than the prevailing rate of wages as defined by the Labor Law.

3. Each laborer, workman or mechanic employed by the Contractor, a Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents shall be provided the supplements required by Article 8 of the Labor Law.

4. The minimum hourly rate of wage to be paid shall be not less than that stated in the Contract Documents, and shall be as designated by the Industrial Commissioner.

5. The Contractor's and any Subcontractor's or other person's filing of payrolls in a manner prescribed by subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to the Owner's payment of any sums due and owing to the Contractor, Subcontractor or other party for work done on or with respect to the Project.

§ 17.2 WAGE RATES

§ 17.2.1 The Contractor specifically agrees, as required by the Labor Law, that the contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

1. the prevailing wage rates as provided in Labor Law Section 220(3) as amended, or,

2. the minimum wage rates as provided in Labor Law Section 220-d, as amended.

§ 17.2.2 Contractor shall comply with prevailing wage rates as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this project are included in the Project Manual as part of the Contract Documents.

§ 17.2.3 The Contractor shall comply with all the requirements of the Labor Law Section 220-a, as amended, regarding mandatory submission of certified payroll records, which shall be included with each application for payment.

§ 17.3 ANTI-DISCRIMINATION

§ 17.3.1 The Contractor specifically agrees, as required by the provisions of Section 220-e of the Labor Law, as amended, that:

1. In the hiring of employees for the performance of work under the Contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, sexual orientation, or national origin discriminate against any citizen of the State of New York who is qualified and available to perform -the work to which the employment relates;

2. No contractor, subcontractor, nor any person on his behalf, shall in any manner, discriminate or intimidate any employee hired for the performance of work under the contact on account of race, creed, color, sexual orientation, or national origin.

3. There may be deducted from the amount payable to the Contractor by the Owner under the contract a penalty at fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; and

4. The contract may be canceled or terminated by the Owner, and all monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the contract.

§ 17.4 SEXUAL HARASSMENT TRAINING

§ 17.4.1 Contractor hereby certifies that each employee assigned by the Contractor to the Project shall annually complete Sexual Harassment Prevention Training that meets or exceeds Section 201-g of the New York Labor Law. Upon request by the Owner, Contractor shall provide Owner with a copy of Contractor's Sexual Harassment Prevention Training Program and proof of each employee's annual completion of such Sexual Harassment Prevention Training. Contractor shall indemnify, defend and hold Owner and Owner's employees, officers, directors and board members harmless from and against any and all claims, suits, actions, debts, liabilities, fines, penalties and expenses, including, attorneys' fees, arising from or caused by Contractor or any of Contractor's employees, subcontractors, suppliers or agents failure to comply with Section 201-g of the New York Labor Law.

~~**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:03:20 ET on 11/30/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

Homer Central School District

Lisa Crance, Project Administrator
Airport Corporate Park
AIRPORT CORPORATE PARK
HORSEHEADS NY 14870

Schedule Year	2022
Date Requested	07/29/2022
PRC#	2022008843

Location	Homer Central School District
Project ID#	2503-036
Project Type	Classroom renovations, site work and mechanical improvements

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2022 through June 2023. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

There are very few exceptions to this rule. Complete information regarding these exceptions is available on the "Request for a dispensation to work overtime" form (PW30) and "4 Day / 10 Hour Work Schedule" form (PW 30.1).

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12240; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemperaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid

or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment.Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, but are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12240 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

Homer Central School District

Lisa Crance, Project Administrator
Airport Corporate Park
AIRPORT CORPORATE PARK
HORSEHEADS NY 14870

Schedule Year 2022
Date Requested 07/29/2022
PRC# 2022008843

Location Homer Central School District
Project ID# 2503-036
Project Type Classroom renovations, site work and mechanical improvements

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:
- [ ] (01) General Construction
- [ ] (02) Heating/Ventilation
- [ ] (03) Electrical
- [ ] (04) Plumbing
- [ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

Social Security Numbers on Certified Payrolls:

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concern regarding inclusion of this information on payrolls if another identifier will suffice.

For these reasons, the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor. This change does not affect the Department's ability to request and receive the entire social security number from employers during its public work/ prevailing wage investigations.

Construction Industry Fair Play Act: Required Posting for Labor Law Article 25-B § 861-d

Construction industry employers must post the "Construction Industry Fair Play Act" notice in a prominent and accessible place on the job site. Failure to post the notice can result in penalties of up to $1,500 for a first offense and up to $5,000 for a second offense. The posting is included as part of this wage schedule. Additional copies may be obtained from the NYS DOL website, https://dol.ny.gov/public-work-and-prevailing-wage
If you have any questions concerning the Fair Play Act, please call the State Labor Department toll-free at 1-866-435-1499 or email us at: dol.misclassified@labor.ny.gov .

Worker Notification: (Labor Law §220, paragraph a of subdivision 3-a)

Effective June 23, 2020

This provision is an addition to the existing wage rate law, Labor Law §220, paragraph a of subdivision 3-a. It requires contractors and subcontractors to provide written notice to all laborers, workers or mechanics of the *prevailing wage and supplement rate* for their particular job classification *on each pay stub**. It also requires contractors and subcontractors to *post a notice* at the beginning of the performance of every public work contract *on each job site* that includes the telephone number and address for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her job classification. The required notification will be provided with each wage schedule, may be downloaded from our website *www.labor.ny.gov* or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

---

1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12240

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor**, you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

- **Civil Penalty** — First offense: Up to $2,500 per employee

  Subsequent offense(s): Up to $5,000 per employee

- **Criminal Penalty** — First offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing public work for up to one year.

  Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a $50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at:

https://dol.ny.gov/public-work-and-prevailing-wage

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5156		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is $250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training “prior to the performing any work on the project.”

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.)*
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is $3 million in Bronx, Kings, New York, Queens and, Richmond counties; $1.5 million in Nassau, Suffolk and Westchester counties; and $500,000 in all other counties.

For projects below the monetary threshold, bidders must submit a sealed list naming each subcontractor for the plumbing, HVAC and electrical and the amount to be paid to each. The list may not be changed unless the public owner finds a legitimate construction need, including a change in specifications or costs or the use of a Project Labor Agreement (PLA), and must be open to public inspection.

Allows the state and local agencies and authorities to waive the Wicks Law and use a PLA if it will provide the best work at the lowest possible price. If a PLA is used, all contractors shall participate in apprentice training programs in the trades of work it employs that have been approved by the Department of Labor (DOL) for not less than three years. They shall also have at least one graduate in the last three years and use affirmative efforts to retain minority apprentices. PLA's would be exempt from Wicks, but deemed to be public work subject to prevailing wage enforcement.

The Commissioner of Labor shall have the power to enforce separate specification requirement s on projects, and may issue stop-bid orders against public owners for non-compliance.

Other new monetary thresholds, and similar sealed bidding for non-Wicks projects, would apply to certain public authorities including municipal housing authorities, NYC Construction Fund, Yonkers Educational Construction Fund, NYC Municipal Water Finance Authority, Buffalo Municipal Water Finance Authority, Westchester County Health Care Association, Nassau County Health Care Corp., Clifton-Fine Health Care Corp., Erie County Medical Center Corp., NYC Solid Waste Management Facilities, and the Dormitory Authority.

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

Cortland County General Construction

Boilermaker — 07/01/2022

JOB DESCRIPTION Boilermaker **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Clinton, Cortland, Franklin, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence, Tompkins

WAGES

Per hour:	07/01/2022	01/01/2023	01/01/2024
Boilermaker	$ 36.23	$ 37.23	$ 38.23

SUPPLEMENTAL BENEFITS

Per hour:			
Journeyman	$ 26.01* + 1.23	$ 26.31* + 1.23	$ 26.62* + 1.23

*This portion of the benefits subject to the same premium rate as shown for overtime wages.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 25) on HOLIDAY PAGE
NOTE: When a holiday falls on Sunday, the day observed by the State or Nation shall be observed. When Christmas Day and New Year's fall on Saturday, Friday will be observed as the holiday.

REGISTERED APPRENTICES
WAGES per hour: Six month terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
65%	65%	70%	75%	80%	85%	90%	95%

SUPPLEMENTAL BENEFITS per hour:

$ 19.38* + 1.23	$ 19.38* + 1.23	$ 20.33* + 1.23	$ 21.26* + 1.23	$ 22.20* + 1.23	$ 23.16* + 1.23	$24.13* + 1.23	$ 25.06* + 1.23

*This portion of the benefits subject to the same premium rate as shown for overtime wages.

6-175

Carpenter - Building — 07/01/2022

JOB DESCRIPTION Carpenter - Building **DISTRICT** 2

ENTIRE COUNTIES
Chemung, Cortland, Schuyler, Steuben, Tompkins

PARTIAL COUNTIES
Allegany: Only the Township of Alfred.

WAGES

Per hour:	07/01/2022	07/01/2023 Additional	07/01/2024 Additional	07/01/2025 Additional
Carpenter	$ 30.10	$ 1.00	$ 1.00	$ 1.00
Floor Coverer	30.10	1.00	1.00	1.00
Carpet Layer	30.10	1.00	1.00	1.00
Dry-Wall	30.10	1.00	1.00	1.00
Diver-Wet Day	61.25	0.00	0.00	0.00
Diver -Dry Day	31.10	1.00	1.00	1.00
Diver Tender	31.10	1.00	1.00	1.00

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):
- Pile Drivers/Dock Builders shall receive $0.25 per hour over the journeyman's rate of pay when performing piledriving/dock building work.
- Certified welders shall receive $1.00 per hour over the journeyman's rate of pay when the employee is required to be certified and performs DOT or ABS specified welding work
- When an employee performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require employees to be furnished and use or wear required forms of personal protection, then the employee shall receive his regular hourly rate plus $1.50 per hour.
- Depth pay for Divers based upon deepest depth on the day of the dive (per diem payment):

0' to 80' no additional fee
81'to 100' additional $.50 per foot
101'to 150' additional $0.75 per foot
151'and deeper additional $1.25 per foot

- Penetration pay for Divers based upon deepest penetration on the day of the dive (per diem payment):
0' to 50' no additional fee
51' to 100' additional $.75 per foot
101' and deeper additional $1.00 per foot
- Diver rates applies to all hours worked on dive day.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 21.88

OVERTIME PAY
See (B, E, *E2, Q) on OVERTIME PAGE
* Note - Saturday is also payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
Note: Any holiday which occurs on Sunday shall be observed the following Monday. If Christmas falls on a Saturday, it shall be observed on the prior Friday.

REGISTERED APPRENTICES
CARPENTER APPRENTICES
Wages per hour (1040 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th	5th
55%	60%	65%	70%	80%

Supplemental Benefits per hour:

$ 12.40	$ 12.40	$ 15.05	$ 15.05	$ 15.05

PILEDRIVER/DOCK BUILDER APPRENTICES
Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
55%*	60%*	70%*	80%*

*Pile Driver/Dock Builder apprentices shall receive an additional $0.25 per hour worked when performing piledriving/dock building work.
Supplemental Benefits per hour:

$ 12.40	$ 12.40	$ 15.05	$ 15.05

LINOLEUM, RESILIENT TILE, AND CARPET LAYER APPRENTICES
Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
55%	60%	70%	80%

Supplemental Benefits per hour:

$ 12.40	$ 12.40	$ 15.05	$ 15.05

ADDITIONAL AMOUNTS PAID PER HOUR WORKED TO APPRENTICES FOR SPECIFIC TYPES OF WORK PERFORMED:
- Certified welders shall receive $1.00 per hour over the apprentices rate of pay when the apprentice is required to be certified and performs DOT or ABS specified welding work
- When an apprentice performs work within a contaminated area on a State and/or Federally designated hazardous waste site, and where relevant State and/or Federal regulations require the apprentice to be furnished and use or wear required forms of personal protection, then the apprentice shall receive his regular hourly rate plus $1.50 per hour.

2-277B-CS

Carpenter - Building / Heavy&Highway 07/01/2022

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Wages per hour:	07/01/2022	07/01/2023 Additional	07/01/2024 Additional
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	$ 33.08	$ 2.25*	$2.25*

*To be allocated at a later date
Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 25.45

OVERTIME PAY
See (B, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE
Notes:
When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. Whan a holiday falls upon a Sunday, it shall be observed on the following Monday.
An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES
Wages per hour (1300 hour terms at the following percentage of Journeyman's wage):

1st	2nd	3rd	4th
65%	70%	75%	80%

Supplemental Benefits per hour:

1st term	$ 16.97
2nd term	17.41
3rd term	19.40
4th term	19.84

2-42AtSS

Carpenter - Heavy&Highway — 07/01/2022

JOB DESCRIPTION Carpenter - Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Broome, Cayuga, Chemung, Cortland, Delaware, Jefferson, Lewis, Onondaga, Oswego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Yates

WAGES

Per hour	07/01/2022	05/01/2023 Additional	05/01/2024 Additional
Carpenter	$ 34.13	$ 2.50*	$ 2.75*
Piledriver	34.13	2.50*	2.75*
Diver-Wet Day	59.13	2.50*	2.75*
Diver-Dry Day	35.13	2.50*	2.75*
Diver-Tender	35.13	2.50*	2.75*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (per hour worked):
- When project owner mandates a single irregular work shift, the employee will receive an additional $3.00 per hour. A single irregular work shift can start any time from 5:00 p.m. to 1:00 a.m.
- State or Federal designated hazardous site, requiring protective gear shall be an additional $2.50 per hour.
- Certified welders when required to perform welding work will receive an additional $2.50 per hour.

ADDITIONAL NOTES PERTAINING TO DIVERS/TENDERS:

- Divers and Tenders shall receive one and one half (1 1/2) times their regular diver and tender rate of pay for Effluent and Slurry diving.
- Divers and tenders being paid at the specified rate for Effluent and Slurry diving shall have all overtime rates based on the specified rate plus the appropriate overtime rates (one and one half or two times the specified rate for Slurry and Effluent divers and tenders).
- The pilot of an ADS or submersible will receive one and one-half (1 1/2) times the Diver-Wet Day Rate for time submerged.
- All crew members aboard a submersible shall receive the Diver-Wet Day rate.
- Depth pay for Divers based upon deepest depth on the day of the dive (per diem payment):
  0' to 50' no additional fee
  51'to 100' additional $.50 per foot
  101'to 150' additional $0.75 per foot
  151'and deeper additional $1.25 per foot
- Penetration pay for Divers based upon deepest penetration on the day of the dive (per diem payment):
  0' to 50' no additional fee
  51' to 100' additional $.75 per foot
  101' and deeper additional $1.00 per foot
- Diver rates applies to all hours worked on dive day.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Friday, provided the project duration is more than forty (40) hours.
NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 25.45

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
- In the event a Holiday falls on a Saturday, the Friday before will be observed as a Holiday. If a Holiday falls on a Sunday, then Monday will be observed as a Holiday. Employee must work scheduled work day before and after the Holiday.
- The employee must work their scheduled workday before and their scheduled workday after the holiday to receive holiday pay.

REGISTERED APPRENTICES
CAPRENTER APPRENTICES
Wages per hour (1040 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th	5th
65%	70%	75%	80%	85%

Supplemental Benefits per hour:

$ 16.97	$ 17.41	$ 19.40	$ 19.84	$ 20.28

PILEDRIVER/DOCKBUILDER APPRENTICES
Wages per hour (1300 hour terms at the following percentage of journeyman's base wage):

1st	2nd	3rd	4th
65%	70%	80%	85%

Supplemental Benefits per hour:

$ 16.97	$ 17.41	$ 19.84	$ 20.28

NOTE ADDITIONAL AMOUNTS PAID PER HOUR WORKED TO APPRENTICES FOR SPECIFIC TYPES OF WORK PERFORMED:
- When project owner mandates a single irregular work shift, the employee will receive an additional $3.00 per hour. A single irregular work shift can start any time from 5:00 p.m. to 1:00 a.m.
- State or Federal designated hazardous site, requiring protective gear shall be an additional $2.50 per hour.
- Certified welders when required to perform welding work will receive an additional $2.50 per hour.

2-277HH-Bro

Electrician 07/01/2022

JOB DESCRIPTION Electrician **DISTRICT** 6

ENTIRE COUNTIES
Cortland, Herkimer, Madison, Oneida, Oswego

PARTIAL COUNTIES
Cayuga: Townships of Ira, Locke, Sempronius, Sterling, Summerhill and Victory.
Chenango: Only the Townships of Columbus, New Berlin and Sherburne.
Onondaga: Entire County except Townships of Elbridge and Skaneateles.
Otsego: Only the Townships of Plainfield, Richfield, Springfield, Cherry Valley, Roseboom, Middlefield, Otsego, Exeter, Edmeston, Burlington, Pittsfield and New Lisbon.
Tompkins: Only the Township of Groton.

Wayne: Only the Townships of Huron, Wolcott, Rose and Butler.

WAGES

Per hour:	07/01/2022	06/01/2023 Additional
Electrician	$ 42.00	$ 3.00*
Teledata	42.00	
Cable Splicer	46.20	

*To be allocated at a later date.

NOTE: Additional premiums for the following work listed:
- Additional $2.00 per hour for work performed over 35 feet above the ground, floor, or roof levels or where work is required in tunnels, shafts, or under compressed air 35 feet below the ground level.
- Additional $2.50 per hour for working over 50 feet above or below ground, floor, or roof level. This includes work on ladders, "toothpicks", scaffolds, boatswain chairs, towers, smokestacks or other open structures, or mechanical lifts used over 60 feet.

NOTES:
THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF EIGHT (8) HOURS FOR AT LEAST FIVE (5) DAYS DURATION WHICH MAY HAVE BEEN WORKED. WHEN TWO (2) SHIFTS OR THREE (3) SHIFTS ARE WORKED:

1ST SHIFT	8:00AM - 4:30PM:	See rates posted above
2ND SHIFT	4:30 PM - 1:00 AM:	Add 15% to rates posted above
3RD SHIFT	12:30 AM - 9:00 AM:	Add 25% to rates posted above

Occupied Conditions: When necessary to perform alteration and/or renovation work and owner mandates (due to occupied conditions) prevent the work from being performed during "normal" working hours (defined as between 6:00 a.m. and 4:30 p.m. Monday through Friday), alternate hours may be worked, provided: 1) The hours are established for a minimum of five (5) days duration or the length of the job, whichever is shorter; and 2) An entire work scope within a job-site area is performed utilizing the varied hours. If these conditions are satisfied, all hours worked Monday through Friday of a shift that starts before or ends after the "normal" hours, shall be paid at the appropriate rate plus fifteen percent (15%). However, the following restrictions shall apply:

1) "Alternate" hours shall consist of a minimum of eight consecutive hours per day
2) Hours worked in excess of eight (8) hours per day, Monday through Friday, shall be paid at a rate of one and one-half times the applicable rate (day-shift + 15%)
3) Hours worked on Saturday shall be paid at time and one-half the applicable rate.
4) Hours worked on Sundays and Holidays shall be paid at double the straight time rate.
5) Work of a new construction nature may not be worked under these conditions.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2022
Journeyman	$ 29.17 plus *3% of hourly wage paid

*NOTE: The 3% is based on the hourly wage paid, straight time or premium rate.

OVERTIME PAY

See (B,E**,Q) on OVERTIME PAGE
** Double Time after 10 hrs. on Saturday.
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If any of the above holidays fall on Saturday, Friday shall be observed as the holiday. If any of the above holidays fall on Sunday, Monday shall be observed as the holiday.

REGISTERED APPRENTICES

WAGES per hour: Hourly terms at the following percentage of Journeyman's wage.

1st period 40% (0-1000 hrs.)	$ 16.80

2nd period 45% (1001-2000)	18.90
3rd period 50% (2001-3500)	21.00
4th period 60% (3501-5000)	25.20
5th period 70% (5001-6500)	29.40
6th Period 80% (6501-8000)	33.60

SUPPLEMENTAL BENEFITS per hour:

1st period	$ 13.09 plus *3% of hourly wage paid
2nd period	$ 13.09 plus *3% of hourly wage paid
3rd period	$ 26.55 plus *3% of hourly wage paid
4th period	$ 27.07 plus *3% of hourly wage paid
5th period	$ 27.60 plus *3% of hourly wage paid
6th period	$ 28.12 plus *3% of hourly wage paid

*NOTE: The 3% is based on the hourly wage paid, straight time rate or premium rate.

6-43

Elevator Constructor — 07/01/2022

JOB DESCRIPTION Elevator Constructor **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Chenango, Cortland, Franklin, Jefferson, Lewis, Onondaga, Oswego, St. Lawrence, Tioga, Tompkins

PARTIAL COUNTIES
Delaware: Only the towns of: Tompkins, Walton, Masonville, Sidney, Franklin and Deposit.
Madison: Only the towns of: Cazenovia, DeRuyter, Eaton, Fenner, Georgetown, Lebanon, Lenox, Nelson and Sullivan.
Oneida: Only the towns of: Camden, Florence and Vienna.

WAGES

Per hour:	07/01/2022
Elevator Constructor	$ 51.43
Helper	36.00

Four (4), ten (10) hour days may be worked for New Construction and Modernization Work at straight time during a week, Monday thru Thursday, or Tuesday thru Friday

*** Four(4), ten (10) hour days are not permitted for Contract Work/Repair Work

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	$ 36.885*

*NOTE - add 6% of regular hourly rate for all hours worked. Add 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY
See (D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 15, 16) on HOLIDAY PAGE
Overtime: See (5, 6, 15, 16) on HOLIDAY PAGE
NOTE: When a paid holiday falls on a Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
WAGES per hour: 1 year terms at the following percentage of the Elevator Constructor wage.

0-6 months	6-12 months	2nd year	3rd year	4th year
50%	55%	65%	70%	80%

SUPPLEMENTAL BENEFITS per hour:

0-6 months: 6% of the hourly apprentice rate paid, no additional supplemental benefits.

All other terms: Same as Journeyman.

6-62.1

Glazier 07/01/2022

JOB DESCRIPTION Glazier **DISTRICT** 5

ENTIRE COUNTIES
Cayuga, Cortland, Herkimer, Madison, Oneida, Onondaga, Oswego

WAGES
Per Hour: 07/01/2022

Glazier	$ 26.05

** IMPORTANT NOTICE **
Four (4), ten (10) days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 23.64

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE.
*Note - Or circumstances beyond the control of the employer.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
1000 hour terms:

Appr. 1st term	$17.00
Appr. 2nd term	18.00
Appr. 3rd term	19.00
Appr. 4th term	20.00
Appr. 5th term	21.00
Appr. 6th term	22.00
Appr. 7th term	23.00
Appr. 8th term	24.00

Supplemental Benefits per hour:

Appr. 1st term	$ 12.29
Appr. 2nd term	12.29

Appr. 3rd term	18.29
Appr. 4th term	18.29
Appr. 5th term	19.29
Appr. 6th term	19.29
Appr. 7th term	20.29
Appr. 8th term	20.29

5-677.Z-2

Insulator - Heat & Frost — 07/01/2022

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Chemung, Chenango, Cortland, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Tioga, Tompkins

WAGES

Per hour:	07/01/2022
Asbestos Installer	$ 37.00
Insulation Installer (On mechanical systems only)	

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED SHIFTS WORKED.

1ST SHIFT	$ 37.00
2ND SHIFT	42.55
3RD SHIFT	46.25

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	$ 24.34

OVERTIME PAY
See (*B1, Q) on OVERTIME PAGE
*NOTE: First 10 hours on Saturday

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (4,6) on HOLIDAY PAGE. Triple time for Labor Day if worked.

NOTE: When a holiday falls on Sunday, the following Monday shall be observed as a holiday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th
50%	60%	70%	80%
$ 18.50	$ 22.20	$ 25.90	$ 29.60

SUPPLEMENTAL BENEFITS per hour:

$ 21.84	$ 21.84	$ 24.34	$ 24.34

6-30-Syracuse

Ironworker — 07/01/2022

JOB DESCRIPTION Ironworker **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Cortland, Onondaga, Oswego, Seneca, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Only the Townships of Lincklaen, Otselic, Pitcher, Pharsalia, German, McDonough, Preston, Norwich, Smithville, Oxford, Guilford, Greene, Coventry, Bainbridge and Afton.
Jefferson: Only the Townships of Alexandria, Theresa, Clayton, Orleans, Cape Vincent, Lyme, Brownville, Pamelia, LeRay, Hounsfield, Watertown, Rutland, Adams, Henderson, Rodman, Ellisburg, Lorraine and Worth.

Madison: Only the Townships of Sullivan, Lenox, Lincoln, Fenner, Smithfield, Cazenovia, Nelson, DeRuyter and Georgetown.
Schuyler: Only the Townships of Cayuta, Catharine, Hector and Montour.
Wayne: Only the Townships of Galen, Savannah, Rose, Butler, Huron and Wolcott

WAGES
Structural, Reinforcing, Re-bar, Machinery Mover & Rigger, Ornamental & Curtain Wall, Window Wall, Pre-Glazed Metal Framed Windows Attached to Steel or Masonry Including Caulking, Fence Erector (Chain Link/Security), Sheeter/Bridge Rail, Pre-Cast Erector, Stone Derrickman, Pre-Engineered Building Erector, Welder

Per hour:	07/01/2022	07/01/2023 Additional
	$ 31.80	$ 1.50*

*To be allocated at a later date.

NOTE: Shift work mandated by the project owner. All shifts will be (8) hours.

1st Shift	$ 31.80
2nd Shift	34.98
3rd Shift	36.57

WHEN A SINGLE IRREGULAR SHIFT IS WORKED, WITH START TIMES BASED ON SECOND AND THIRD SHIFTS, ADD 10 % TO THE WAGE RATE POSTED ABOVE.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 30.53

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: Any holiday which occurs on Sunday shall be observed the following Monday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following rates.

1st	2nd	3rd	4th
$ 19.50	$ 21.50	$ 23.50	$ 25.50

SUPPLEMENTAL BENEFITS per hour:

1st year	$ 11.53
2nd year	19.58
3rd year	20.73
4th year	21.88

6-60

Laborer - Building 07/01/2022

JOB DESCRIPTION Laborer - Building **DISTRICT** 2

ENTIRE COUNTIES
Cortland, Tompkins

PARTIAL COUNTIES
Schuyler: Only the Township of Catherine including the Village of Odessa.
Tioga: Townships of Candor & Spencer

WAGES
Per hour:

GROUP #1: Basic Laborer - excavation, concrete vibrator, power-driven buggie, demolition (including acetylene torch work) that is customarily done by a laborer

GROUP #2: Air Tool Operators, Mason Tenders

GROUP #3: Blaster, Rock Drill (compressor driven)

GROUP #4: Asbestos, Hazardous, Toxic Waste, Lead and Mold Remediation

	07/01/2022	07/01/2023 Additional	07/01/2024 Additional	07/01/2025 Additional
GROUP #1	$ 25.75	$ 1.00*	$ 1.00*	$ 1.00*
GROUP #2	26.75	1.00*	1.00*	1.00*
GROUP #3	27.75	1.00*	1.00*	1.00*
GROUP #4	27.75	1.00*	1.00*	1.00*

*To be allocated at a later date.

IMPORTANT NOTES:
- Laborer tasks on Renewable Energy and Green Energy construction work shall be paid at the appropriate Heavy & Highway rates.
- Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Friday, provided the project duration is more than forty (40) hours.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 21.45

OVERTIME PAY
See (B, E, *E2, Q) on OVERTIME PAGE
*If working four (4) ten (10) hour days the make up day will be on Friday.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
When a holiday falls on Sunday, it shall be observed on the following Monday.

REGISTERED APPRENTICES
WAGES: 1000 hour terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 14.10
2nd term	15.35
3rd term	16.23
4th term	17.10

2-785b

Laborer - Heavy&Highway **07/01/2022**

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Entire County except the Townships of Sherburne, Columbus and New Berlin.
Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock and Colchester.

WAGES
Per hour:

GROUP A: Drill Helper, Flagman, Outboard and Hand Boats.

GROUP B: Basic Rate, Bull Float (where used for strike off only), Chain Saw, Concrete Aggregate Bin, Concrete Bootmen, Gin Buggy, Hand or Machine Vibrator, Jack Hammer, Mason Tender, Mortar Mixer, Pavement Breaker, Handlers of Steel Mesh, Small Generators for Laborers Tools, Installation of Bridge Drainage Pipe, Pipe Layers, Vibrator Type Rollers, Tamper, Drill Doctor, Water Pump Operators (1-1/2" & Single Diaphragm), Nozzle (Asphalt, Gunite, Seeding, and Sand Blasting), Laborers on Chain Link Fence Erection, Rock Splitter and Power Unit, Pusher Type Concrete Saw and all other Gas, Electric, and Air Tool Operators, Wrecking Laborer.

GROUP C: Drilling equipment - only where a separate air compressor unit supplies power, Acetylene Torch Operators, Asphalt Raker, Powder Man, Tail or Screw Operator on Asphalt Paver.

GROUP D: Blasters, Form Setters (slab steel forms on highways, roads, streets & airport runways), Stone or Granite Curb Setters.

GROUP E: Hazardous Waste defined as when an employee performs hazardous waste removal, lead abatement and removal, asbestos abatement and removal work on State and/or Federally designated waste site, and were relevant State and/or Federal regulations require employees to use or wear required forms of personal protection.

	07/01/2022	07/01/2023 Additional	07/01/2024 Additional
GROUP A	$ 32.80	$ 3.00*	$ 2.50*
GROUP B	33.00	3.00*	2.50*
GROUP C	33.20	3.00*	2.50*
GROUP D	33.40	3.00*	2.50*
GROUP E	36.00	3.00*	2.50*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS FOR THE FOLLOWING CONDITIONS:
- A single irregular work shift starting any time between 5:00 PM and 1:00 AM on governmental mandated night work shall be paid an additional $3.00 per hour.
- When an employee is required by the employer and/or by the material data safety sheets of a product, during its application, to wear a half or full face replaceable cartridge respirator for more then (2) hours, then in such case said employee(s) will be paid the Group E rate for the shift.

IMPORTANT NOTES:
- Laborer tasks on Renewable Energy and Green Energy construction work shall be paid at the appropriate Heavy & Highway rates.
- Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 23.11

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
- If Holiday falls on Sunday, it will be celebrated on Monday. If the Holiday falls on Saturday, it will be celebrated on Saturday.
- An Employee must work the scheduled working day before and the scheduled working day after a holiday to receive holiday pay. However, an employee not able to report because of proven sickness, death in immediate family, or accident shall be entitled to holiday pay.

REGISTERED APPRENTICES
WAGES: 1000 hour terms at the following percentage of Journeyman's GROUP B wage:

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 20.86
2nd term	21.61
3rd term	21.99
4th term	22.36

2-785h

Laborer - Tunnel 07/01/2022

JOB DESCRIPTION Laborer - Tunnel **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chemung, Cortland, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Chenango: Entire County except the Townships of Sherburne, Columbus, and New Berlin.
Delaware: Only the Townships of Sidney, Masonville, Walton, Tompkins, Deposit, Hancock and Colchester.

WAGES
Per hour:

GROUP A: Change House Man

GROUP B: Miners and all Machine Men, Safety Miner, All Shaft work, Caisson work, Drilling, Blow Pipe, all Air Tools, Tugger, Scaling, Nipper, Guniting pot to nozzle, Bit Grinder, Signal Man (top and bottom), Concrete Man, Shield Driven Tunnels, mixed face and soft ground, liner plate tunnels in free air.

GROUP C: Blaster

GROUP D: Hazardous waste removal work on a State and/or Federally designated waste site where relevant State and/or Federal regulations require employees to use or wear required forms of personal protection.

	07/01/2022	07/01/2023 Additional	07/01/2024 Additional
Group A	$ 35.98	$ 3.00*	$ 2.00*
Group B	36.18	3.00*	2.00*
Group C	38.98	3.00*	2.00*
Group D	39.18	3.00*	2.00*

*To be allocated at a later date.

NOTE ADDITIONAL AMOUNTS FOR THE FOLLOWING CONDITIONS:
- A single irregular work shift starting any time between 5:00 PM and 1:00 AM on governmental mandated night work shall be paid an additional $3.00 per hour.
- When an employee is required by the employer and/or by the material data safety sheets of a product, during its application, to wear a half or full face replaceable cartridge respirator for more then (2) hours, then in such case said employee(s) will be paid the Group D rate for the shift.

IMPORTANT NOTE: Wage and supplement rates for the operation of forklift and skid steer may be found under the classification "Operating Engineer".

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman $ 23.11

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
- If Holiday falls on Sunday, it will be celebrated on Monday. If the Holiday falls on Saturday, it will be celebrated on Saturday.
- An Employee must work the scheduled working day before and the scheduled working day after a holiday to receive holiday pay. However, an employee not able to report because of proven sickness, death in immediate family, or accident shall be entitled to holiday pay.

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
If the holiday falls on Saturday, it will be celebrated on Friday. If the holiday falls on Sunday, it will be celebrated on Monday

REGISTERED APPRENTICES
WAGES: 1000 hour terms at the following percentage of Group B wage

1st	2nd	3rd	4th
70%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

1st Term	$ 7.75
2nd Term	7.75
3rd Term	15.51
4th Term	23.11

2-785T

Lineman Electrician — 07/01/2022

JOB DESCRIPTION Lineman Electrician **DISTRICT** 6

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES

A Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors, assembly of all electrical materials, conduit, pipe, or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines. Also includes digging of holes for poles, anchors, footer, and foundations for electrical equipment.

Below rates applicable on all overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. (Ref #14.01.01)

Per hour:	07/01/2022	05/01/2023	05/06/2024
Lineman, Technician	$ 56.00	$ 57.40	$ 58.90
Crane, Crawler Backhoe	56.00	57.40	58.90
Welder, Cable Splicer	56.00	57.40	58.90
Digging Mach. Operator	50.40	51.66	53.01
Tractor Trailer Driver	47.60	48.79	50.07
Groundman, Truck Driver	44.80	45.92	47.12
Equipment Mechanic	44.80	45.92	47.12
Flagman	33.60	34.44	35.34

Additional $1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work". (Ref #14.02.01-A)

Lineman, Technician	$ 56.00	$ 57.40	$ 58.90
Crane, Crawler Backhoe	56.00	57.40	58.90
Cable Splicer	61.60	63.14	64.79
Certified Welder -			
Pipe Type Cable	58.80	60.27	61.85
Digging Mach. Operator	50.40	51.66	53.01
Tractor Trailer Driver	47.60	48.79	50.07
Groundman, Truck Driver	44.80	45.92	47.12
Equipment Mechanic	44.80	45.92	47.12
Flagman	33.60	34.44	35.34

Additional $1.00 per hour for entire crew when a helicopter is used.

Below rates apply on switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. (Ref #14.02.01-B)

Lineman, Tech, Welder	$ 57.32	$ 58.72	$ 60.22
Crane, Crawler Backhoe	57.32	58.72	60.22
Cable Splicer	63.05	64.59	66.24
Certified Welder -			
Pipe Type Cable	60.19	61.66	63.23
Digging Mach. Operator	51.59	52.85	54.20
Tractor Trailer Driver	48.72	49.91	51.19
Groundman, Truck Driver	45.86	46.98	48.18
Equipment Mechanic	45.86	46.98	48.18
Flagman	34.39	35.23	36.13

Additional $1.00 per hour for entire crew when a helicopter is used.

Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. (Ref #14.03.01)

Lineman, Tech, Welder	$ 58.51	$ 59.91	$ 61.41

Crane, Crawler Backhoe	58.51	59.91	61.41
Cable Splicer	58.51	59.91	61.41
Digging Mach. Operator	52.66	53.92	55.27
Tractor Trailer Driver	49.73	50.92	52.20
Groundman, Truck Driver	46.81	47.93	49.13
Equipment Mechanic	46.81	47.93	49.13
Flagman	35.11	35.95	36.85

Additional $1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM to 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM to 1:00 AM REGULAR RATE PLUS 17.3 %
3RD SHIFT	12:30 AM to 9:00 AM REGULAR RATE PLUS 31.4 %

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.
NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2022	05/01/2023	05/06/2024
Journeyman	$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid
Journeyman Lineman or Equipment Operators with Crane License	$ 27.90 *plus 7% of the hourly wage paid	$ 29.40 *plus 7% of the hourly wage paid	$ 30.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime	See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2022	05/01/2023	05/06/2024
$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a

Lineman Electrician - Teledata — 07/01/2022

JOB DESCRIPTION Lineman Electrician - Teledata **DISTRICT** 6

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES
Per hour:

For outside work, stopping at first point of attachment (demarcation).

	07/01/2022	01/01/2023	01/01/2024	01/01/2025
Cable Splicer	$ 36.28	$ 37.73	$ 39.24	$ 40.81
Installer, Repairman	$ 34.43	$ 35.81	$ 37.24	$ 38.73
Teledata Lineman	$ 34.43	$ 35.81	$ 37.24	$ 38.73
Tech., Equip. Operator	$ 34.43	$ 35.81	$ 37.24	$ 38.73
Groundman	$ 18.25	$ 18.98	$ 19.74	$ 20.53

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT	REGULAR RATE
2ND SHIFT	REGULAR RATE PLUS 10%
3RD SHIFT	REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2022	01/01/2023	01/01/2024	01/01/2025
Journeyman	$ 5.14 *plus 3% of the hourly wage paid	$ 5.14 *plus 3% of the hourly wage paid	$ 5.14 *plus 3% of the hourly wage paid	$ 5.14 *plus 3% of the hourly wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting — 07/01/2022

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT** 6

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Warren, Washington, Wayne, Wyoming, Yates

WAGES
Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator/equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
(Ref #14.01.01)

Per hour:	07/01/2022	05/01/2023	05/06/2024
Lineman, Technician	$ 48.19	$ 49.32	$ 50.54
Crane, Crawler Backhoe	48.19	49.32	50.54
Certified Welder	50.60	51.79	53.07
Digging Machine	43.37	44.39	45.49
Tractor Trailer Driver	40.96	41.92	42.96
Groundman, Truck Driver	38.55	39.46	40.43
Equipment Mechanic	38.55	39.46	40.43
Flagman	28.91	29.59	30.32

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM	REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM	REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM	REGULAR RATE PLUS 31.4%

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. Tuesday thru Friday may be worked with no make-up day.
NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour worked (but also required on non-worked holidays):

	07/01/2022	05/01/2023	05/06/2024
Journeyman	$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid
Journeyman Lineman or Equipment Operators with Crane License	$ 27.90 *plus 7% of the hourly wage paid	$ 29.40 *plus 7% of the hourly wage paid	$ 30.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE. *Note* Double time for all emergency work designated by the Dept. of Jurisdiction.
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

1st	2nd	3rd	4th	5th	6th	7th
60%	65%	70%	75%	80%	85%	90%

SUPPLEMENTAL BENEFITS per hour:

07/01/2022	05/01/2023	05/06/2024
$ 25.90 *plus 7% of the hourly wage paid	$ 26.40 *plus 7% of the hourly wage paid	$ 26.90 *plus 7% of the hourly wage paid

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249a-LT

Lineman Electrician - Tree Trimmer — 07/01/2022

JOB DESCRIPTION Lineman Electrician - Tree Trimmer **DISTRICT** 6

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES
Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also would include stump removal near underground energized electrical lines, including telephone and CATV lines.

Per hour:	07/01/2022	01/01/2023
Tree Trimmer	$ 28.25	$ 29.80
Equipment Operator	24.98	26.35
Equipment Mechanic	24.98	26.35
Truck Driver	20.80	21.94
Groundman	17.13	18.07
Flag person	13.20*	13.20*

*NOTE: Subject to change due to any minimum wage increases.

SUPPLEMENTAL BENEFITS
Per hour worked (but also required on non-worked holidays):

	07/01/2022	01/01/2023
Journeyman	$ 10.23 *plus 3% of the hourly wage paid	$ 10.48 *plus 3% of the hourly wage paid

* The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE
NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked. Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY
Paid: See (5, 6, 8, 15) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE
NOTE: All paid holidays falling on a Saturday shall be observed on the preceding Friday.
All paid holidays falling on a Sunday shall be observed on the following Monday.

6-1249TT

Mason - Building — 07/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 5

ENTIRE COUNTIES
Cortland, Tompkins

WAGES

Per hour:	07/01/2022
Building:	
Brick/Blocklayer, Cement Mason	$ 33.63
Plasterer/EFIS, Stone Mason, Tuck Pointer	

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	$ 24.74

OVERTIME PAY

See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
$ 21.50	$ 26.54	$ 27.65	$ 30.27

Supplemental Benefits per hour:

1st	2nd	3rd	4th
$ 21.56	$ 21.62	$ 23.91	$ 24.70

5-3B Ith - Z2

Mason - Heavy&Highway 07/01/2022

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 5

ENTIRE COUNTIES

Allegany, Broome, Chautauqua, Chemung, Chenango, Cortland, Delaware, Genesee, Livingston, Monroe, Ontario, Orleans, Otsego, Schuyler, Seneca, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

PARTIAL COUNTIES

Cattaraugus: Enitre county except in the Township of Perrysburg and the Village of Gowanda only the Bricklayer classification applies.
Erie: Only the Bricklayer classification applies.
Niagara: Only the Bricklayer classification applies.

WAGES

Per hour:	07/01/2022
Heavy & Highway:	
Cement Mason	$ 34.88
Bricklayer	34.88

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	$ 23.53

OVERTIME PAY

See (B, E, E2, Q) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

1500 hour terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th
50%	60%	70%	80%

Supplemental benefits per hour:

1st term	$ 14.03
2nd term	$ 22.97
3rd term	$ 23.11
4th term	$ 23.25

5-3h

Mason - Tile Finisher — 07/01/2022

JOB DESCRIPTION Mason - Tile Finisher **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chemung, Chenango, Cortland, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Allegany: Towns of Alfred, Almond, Andover and Burns.

WAGES

Wages	
Per hour:	07/01/2022
Building:	
Marble, Slate, Terrazzo and Tile Finisher	$ 30.86

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 18.61

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd
$ 18.52	$ 21.60	$ 24.69

Supplemental benefits per hour:

1st	2nd	3rd
$ 12.17	$ 12.28	$ 16.44

5-3TF - Z4

Mason - Tile Setter — 07/01/2022

JOB DESCRIPTION Mason - Tile Setter **DISTRICT** 5

ENTIRE COUNTIES
Broome, Chemung, Chenango, Cortland, Delaware, Otsego, Schuyler, Steuben, Tioga, Tompkins

PARTIAL COUNTIES
Allegany: Towns of Alfred, Almond, Andover and Burns.

WAGES

Wages	
Per Hour:	07/01/2022
Building:	
Marble, Slate, Terrazzo and Tile Setter	$ 33.69

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 21.56

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Joureyman's wage:

1st	2nd	3rd	4th
$ 20.21	$ 23.58	$ 26.95	$ 30.32

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 12.29	$ 12.42	$ 21.30	$ 21.43

5-3TS - Z4

Millwright — 07/01/2022

JOB DESCRIPTION Millwright **DISTRICT** 6

ENTIRE COUNTIES
Albany, Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Wyoming, Yates

WAGES
THE FOLLOWING RATE APPLIES TO ANY GAS/STEAM TURBINE AND OR RELATED COMPONENT WORK, INCLUDING NEW INSTALLATIONS OR MAINTENANCE AND ANY/ALL WORK PERFORMED WITHIN THE PROPERTY LIMITS OF A NUCLEAR FACILITY.

Per hour:	07/01/2022
Millwright - Power Generation	$ 41.23

NOTE: ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive an additional $1.75 per hour provided he/she is directed to perform certified welding.
- If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) are required, then that employee shall receive an additional $1.50 per hour.
- An employee performing the work of a machinist shall receive an additional $2.00 per hour. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
- When performing work underground at 500 feet and below, the employee shall receive an additional $1.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour paid:

Journeyman	$ 26.72*

*NOTE: Subject to OT premium

OVERTIME PAY
See (B, E, *E2, Q, V) on OVERTIME PAGE
*NOTE - Saturday may be used as a make-up day and worked at the straight time rate of pay during a work week when conditions such as weather, power failure, fire, or natural disaster prevent the performance of work on a regular scheduled work day.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyman's wage:

Appr. 1st year	65 %*
Appr. 2nd year	75 %*
Appr. 3rd year	80 %*
Appr. 4th year	90 %*

*NOTE: Additional premium for the following work listed below:

Certified Welder	$ 1.75
Hazardous Waste Work	1.50
Machinist	2.00
Underground (500' and below)	1.00

SUPPLEMENTAL BENEFITS per hour:

Appr. 1st year	$ 11.83
Appr. 2nd year	22.26
Appr. 3rd year	23.74
Appr. 4th year	25.24

6-1163Power

Millwright — 07/01/2022

JOB DESCRIPTION Millwright **DISTRICT** 6

ENTIRE COUNTIES
Chemung, Cortland, Livingston, Monroe, Ontario, Orleans, Schuyler, Steuben, Tompkins, Wayne, Wyoming

WAGES
Per hour: 07/01/2022

Building	$ 33.11
Heavy & Highway*	35.11

* Effective 5/01/2019, all Heavy & Highway (H/H) Millwright construction will be paid at the rate indicated above.

NOTE: ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive an additional $1.75 per hour provided he/she is directed to perform certified welding.
- On Building projects, If a work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) are required, then that employee shall receive an additional $1.50 per hour.
- H/H work performed on hazardous waste sites where employees are required to wear protective gear shall receive an additional $2.00 per hour over the Millwright H/H rate for all hours worked on the day protective gear was worn.
- An employee performing the work of a machinist shall receive an additional $2.00 per hour. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
- When performing work underground at 500 feet and below, the employee shall receive an additional $1.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 25.32

OVERTIME PAY
See (B, E, *E2, Q) on OVERTIME PAGE

*NOTE - Saturday may be used as a make-up day and worked at the straight time rate of pay during a work week when conditions such as weather, power failure, fire, or natural disaster prevent the performance of work on a regular scheduled work day.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: Any holiday that falls on Sunday shall be observed the following Monday. Any holiday that falls on Saturday shall be observed the preceding Friday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyman's wage:

Appr. 1st year	65 %*
Appr. 2nd year	75 %*
Appr. 3rd year	80 %*
Appr. 4th year	90 %*

*NOTE: Additional premium for the following work listed below:

Certified Welder	$ 1.75
Hazardous Waste Work (bldg)	1.50
Hazardous Waste Work (H/H)	2.00
Machinist	2.00
Underground (500' and below)	1.00

SUPPLEMENTAL BENEFITS per hour:

Appr. 1st year	$ 11.58
Appr. 2nd year	21.20
Appr. 3rd year	22.57
Appr. 4th year	23.95

6-1163

Operating Engineer - Building — 07/01/2022

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence, Tompkins

WAGES
NOTE:
---If a prime contract is let for site work only, meaning no buildings are involved in their site contract, the Heavy/Highway rates would be applicable. When a prime contract is let for site work and building excavation is part of that contract, the Building rates would be applicable for the Operators classification.
---In the event that equipment listed below is operated by robotic control, the classification covering the operation will be the same as if manually operated.
---If a second employee is required by the employer for operation of any covered machine, they shall be an Engineer Class C.

CLASSIFICATION A1: Cranes, all types* (Includes Boom Truck, Cherry Picker, Dragline, Overhead Crane, Pile Driver, Truck Crane)

CLASSIFICATION A: Air Plako, Asphalt & Blacktop Roller, Automated Concrete Spreader (CMI or equivalent), Automated Fine Grade Machine (CMI), Backhoe, Barrel Shredder, Belt Placer, Blacktop Spreader (such as Barber-Greene & Blaw Knox), Blacktop Plant (automated), Blast or Rotary Drill (Truck or Cat mounted), Burning Plant Operator, Cableway, Caisson Auger, Central Mix Plant (automated), Concrete Pump, Crusher (Rock), Derrick, De-watering Press, Diesel Power Unit, Dirt Filter Press with Operation Equipment, Dredge, Dual Drum Paver, Elevating Grader (self-propelled or towed), Elevator Hoist - Two Cage, Excavator - all purpose hydraulically operated, Fork Lift (Loed/Lull and other rough terrain type), Front End Loader (4 c.y. and over), Gradall, Grader (Power), Head Tower (Saurman or equal), Hoist (2 or 3 Drum), Hydroblaster (Laser Pump), Light Plants - Compressors and Generators, Locomotive, Maintenance Engineer, Maintenance Welder, Mine Hoist, Mucking Machine or Mole, Quarry Master or Equivalent, Refrigeration Equipment (for soil stabilization), Scraper, Sea Mule, Shovel, Side Boom, Slip Form Paver, Straddle Buggy (Ross Carrier, Lumber Carrier), Tractor Drawn Belt Type Loader (Euclid Loader), Trenching Machine (digging capacity of over 4ft. depth), Truck or Trailer Mounted Log Chipper (self-feeder), Tug Operator (Manned, rented equipment excluded), Tunnel Shovel, Vibro or Sonic Hammer Controls (when not mounted in proximity to Rig Operator), Work Boat Operator including LCM's.

CLASSIFICATION B: "A" Frame Truck, Back Dumps, Blacktop Plant (non-automatic), Boring Machine, Bulldozer, Cage-Hoist, Central Mix Plant (non-automated), Compressor, Pump, Generator or Welding machine (when used in battery of not more than five (5)), Concrete Paver (single drum over 16'), Core boring machine, Drill Rigs - tractor mounted, Elevator - as material hoist, Farm Tractor (with or without accessories), Fork Lift (over 10 ton with or without attachments), Front End Loader (under 4 c.y.), Grout Pump, Gunite Machine, High Pressure Boiler (15 lbs. & over), Hoist (one drum), Hydraulic Breaking Hammer (Drop Hammer), Kolman Plant Loader (screening gravel), Maintenance Grease Man, Mixer for stabilized base - self-propelled (Seaman Mixer), Monorail Machine, Parapet Concrete or Pavement Grinder, Parts Man, Post Driver (truck or tractor mounted), Post Hole Digger (truck or tractor mounted), Power Sweeper (Wayne or similar), Pump-Crete or Squeeze-Crete, Road Widener (front end of Grader or self-propelled), Roller, Self-contained hydraulic bench drill, Shell Winder (motorized), Skid steer (Bobcat type loader), Snorkel (overhead arms), Snowblower control man, Tractor (with or without accessories), Trenching Machine (digging capacity of 4 ft. or less), Tugger Hoist, Vacuum Machine (self-propelled or mounted), Vibro Tamp, Well Drill / Well Point System (Submersible pumps when used in lieu of Well Point System), Winch (Motor driven), Winch Cat, Winch Truck

CLASSIFICATION C: Compressor (up to 500 cfm), Concrete Paver or Mixer (under 16'), Concrete Pavement Spreaders & Finishers (not automated), Conveyor (over 12 ft), Electric Submersible Pump (4" and over), Fine Grade Machine (not automated), Fireman, Fork Lift ("with or without" attachments, 10 ton and under), Form Tamper, Generator (2,500 watts and over), Hydraulic Pump, Mechanical Heaters (More than two (2) Mechanical Heaters or any Mechanical Heater or Heaters whose combined output exceeds 640,000 BTU per hour (manufacturer's rating) plus one self-contained heating unit - i.e. Sundog or Air Heat type - New Holland Hay Dryer type excluded), Mulching Machine, Oiler, Power Driven Welding Machine (300 amp and over, other than all electric. One Welding Machine under 300 amp will not require an engineer unless in a battery), Power Heaterman (hay dryer), Pumps (water and trash), Revinus Widener (road widener), Single Light Plant, Steam Cleaner or Jenny.

Per hour: Building	07/01/2022
Master Mechanic	$ 43.42
Asst. Master Mechanic	42.42
Class A1*	42.92
Class A1-Tower Crane*	45.42
Class A	41.42
Class B	39.30
Class C	35.08

Additional $2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

(*) TONNAGE PREMIUMS:
All cranes 65 ton to 199 ton capacity - A1 rate plus $ 1.50
All cranes 200 ton to 399 ton capacity - A1 rate plus $ 2.50
All cranes 400 ton capacity and over - A1 rate plus $ 3.50

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 29.10

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If the holiday falls on Sunday, it will be celebrated on Monday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyman's CLASS A wage:

1st year	60%
2nd year	65%
3rd year	70%
4th year	80%

Additional $2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman

6-158-545b.s

Operating Engineer - Heavy&Highway **07/01/2022**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence, Tompkins

WAGES

NOTE:
---In the event that equipment listed below is operated by robotic control, the classification covering the operation will be the same as if manually operated.
---If a second employee is required by the employer for operation of any covered machine, they shall be an Engineer Class C

CLASS A: Asphalt Curb Machine (self-propelled, slipform); Asphalt Paver; Automated Concrete Spreader (CMI type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Backhoe Excavator, Full Swing (CAT 212 or similar type); Back Filling Machine; Belt Placer (CMI type); Blacktop Plant (automated); Boom Truck; Cableway; Bull Dozer being operated with active GPS; Caisson Auger; Central Mix Concrete Plant (automated); Cherry Picker*; Concrete Curb Machine (self-propelled, slipform); Concrete Pump; Crane*; Derricks*; Directional Boring/Drilling Machine; Dragline*; Dredge; Dual Drum Paver; Excavator (all purpose-hydraulic, Gradall or similar); Front End Loader (4 cu. yd. & over); Head Tower (Sauerman or equal); Hoist (two or three drum); Holland Loader; Maintenance Engineer; Mine Hoist; Mucking Machine or Mole; Overhead Crane* (gantry or straddle type); Pavement Breaker (SP Wertgen; PB-4 and similar type); Profiler (over 105 h.p.); Pile Driver*; Power Grader; Quad 9; Quarry Master (or equivalent); Scraper; Shovel; Side Boom; Slip Form Paver; Tractor Drawn Belt-Type Loader; Truck Crane*; Truck or Trailer Mounted Chipper (self-feeder); Tug Operator (manned rented equipment excluded); Tunnel Shovel

CLASS B: Backhoe (tractor mounted, rubber tired); Bituminous Recycler Machine; Bituminous Spreader and Mixer; Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Bridge Deck Finishing Machine; Brokk; Cage Hoist; Central Mix Plant (non-automated) and All Concrete Batching Plants; Concrete Paver (over 16'); Crawler Drill (self-contained); Crusher; Diesel Power Unit; Drill Rigs (truck or tractor mounted); Front End Loader (under 4 cu. yd.); Greaseman - Lubrication Engineer; HiPressure Boiler (15 lbs & over); Hoist (one drum); Hydro-Axe; Kolman Plant Loader & similar type loaders; Locomotive; Material Handling Knuckle Boom; Mini Excavators (under 18,000 lbs.); Mixer (for stabilized base, self-propelled); Monorail Machine; Profiler (105 h.p. and under); Plant Engineer; Prentice Loader; Pug Mill; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above subgrade); Sea Mule; Self-contained ride-on Rock Drill (excluding Air-Track type drill); Skidder; Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Vacuum Machine (mounted or towed); Vermeer Saws (ride-on, any size or type); Welder; Winch and Winch Cat; Work Boat Operator including L.C.M.'s

CLASS C: "A" Frame Winch Hoist (On Truck); Aggregate Plant; Articulated Heavy Hauler; Asphalt or Concrete Grooving Machine (ride-on); Ballast Regulator (ride-on); Bituminous Heater (self-propelled); Boat (powered); Boiler (used in conjunction with production); Cement & Bin Operator; Compressors**; Concrete Pavement Spreader and Finisher; Concrete Paver or Mixer (16' & under); Concrete Saw (self-propelled); Conveyor; Deck Hand; Directional Boring/Drilling Machine Locator; Drill (Core); Drill (Well); Dust Collectors**; Electric Pump When Used in Conjunction with Well Point System; Farm Tractor with accessories; Fine Grade Machine; Fireman; Fork Lift; Form Tamper; Generators**; Grout Pump; Gunite Machine; Hammers (hydraulic self-propelled); Heaters**; Hydra-Spiker (ride-on); Hydraulic Pump (jacking system); Hydro-Blaster (water); Light Plants**; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Post Hole Digger (excluding hand-held); Post Driver; Power Broom (towed); Power Heaterman; Power Sweeper; Pumps**; Revinius Widener; Roller (subgrade & fill); Scarifier (ride-on); Shell Winder; Skid Steer Loader (Bobcat or similar); Span Saw (ride-on); Steam Cleaner; Tamper (ride-on); Tie Extractor (ride-on); Tie Handlers (ride-on); Tie Inserters (ride-on); Tie Spacers (ride-on); Tire Repair; Track Liner (ride-on); Tractor; Tractor (with towed accessories); Vacuum Machine (self-propelled); Vibratory Compactor; Vibro Tamp; Welding Machines**; Well Point

**CLASS C NOTE: Considered Hands-Off (unmanned). Includes only operation and maintenance of the equipment.

Per hour: H/H	07/01/2022
Master Mechanic	$ 49.50
CLASS A*	48.15
CLASS B	47.27
CLASS C	43.99

(*) Premiums for CRANES are based upon Class A rates with the following premiums:
---Additional $4.00 per hr for Tower Cranes, including self erecting.
---Additional $3.00 per hr for Lattice Boom Cranes and all other cranes with a manufacturer's rating of fifty tons and over.
---Additional $2.00 per hr for all Hydraulic Cranes and Derricks with a manufacturer's rating of 49 ton and below, including boom trucks.

Additional $2.50 per hour for hazardous waste removal work on a State and/or Federally designated waste site which requires employees to wear Level C or above forms of personal protection.

SINGLE IRREGULAR WORK SHIFT: Additional $2.50 per hour for all employees who work a single irregular work shift starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. NOTE - In order to use the '4 Day/10 Hour Work Schedule,' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2022
Journeyman	$ 30.60

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If a holiday falls on Sunday, it will be celebrated on Monday. If an employee works on this Monday, they shall be compensated at double time plus the holiday pay (triple time). If a holiday falls on a Saturday, employees who work a Saturday Holiday shall be paid double time plus the holiday pay.

REGISTERED APPRENTICES
WAGES per hour: (1000) hour terms at the following percentage of Journeyman's CLASS B wage.

1st term	60%
2nd term	70%
3rd term	80%
4th Term	90%

Additional $2.50 per hour for hazardous waste removal work on a State and/or Federally designated waste site which requires employees to wear Level C or above forms of personal protection.

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman

6-158-545h

Operating Engineer - Survey Crew — 07/01/2022

JOB DESCRIPTION Operating Engineer - Survey Crew **DISTRICT** 12

ENTIRE COUNTIES
Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES
Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.
Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES
These rates apply to Building, Tunnel and Heavy Highway.

Per hour:
SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.
Instrument Person - One who operates the surveying instruments.
Rod Person - One who holds the rods and assists the Instrument Person.

	07/01/2022
Party Chief	$ 47.37
Instrument Person	43.51
Rod Person	32.26

Additional $3.00/hr. for Tunnel Work
Additional $2.50/hr. for Hazardous Work Site

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman	$ 28.05

OVERTIME PAY
See (B, E, P, *X) on OVERTIME PAGE
*Note: $24.10/Hr. Only for "ALL" premium hours paid when worked.

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES: 1000 hour terms based on the Percentage of Rod Persons Wage:

07/01/2022

0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	$ 19.83 / PHP $17.03
1001-2000	22.85 / " 19.45
2001-3000	25.88 / " 21.93

NOTE: PHP is premium hours paid when worked.

12-158-545 D.H.H.

Operating Engineer - Survey Crew - Consulting Engineer — 07/01/2022

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT** 12

ENTIRE COUNTIES
Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES
Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.
Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES
These rates apply to feasibility and preliminary design surveying, line and grade surveying for inspection or supervision of construction when performed under a Consulting Engineer Agreement.

Per hour:
SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.
Instrument Person - One who operates the surveying instruments.
Rod Person - One who holds the rods and assists the Instrument Person.

	07/01/2022
Party Chief	$ 47.37
Instrument Person	43.51
Rod Person	32.26

Additional $3.00/hr. for Tunnel Work.
Additional $2.50/hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman	$ 28.05

OVERTIME PAY
See (B, E, Q, *X) on OVERTIME PAGE
*Note: $24.10/Hr. Only for "ALL" premium hours paid when worked.

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
WAGES: 1000 hour terms based on percentage of Rod Persons Wage:

	07/01/2022
0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	$ 19.83 / PHP $17.03
1001-2000	$ 22.85 / " 19.45
2001-3000	$ 25.88 / " 21.93

NOTE: PHP is premium hours paid when worked.

12-158-545 DCE

Operating Engineer - Tunnel 07/01/2022

JOB DESCRIPTION Operating Engineer - Tunnel **DISTRICT** 7

ENTIRE COUNTIES
Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES
Dutchess: Northern part of Dutchess, to the northern boundary line of the City of Poughkeepie, then due east to Route 115 to Bedell Road, then east along Bedell Road to VanWagner Road, then north along VanWagner Road to Bower Road, then east along Bower Road to Rte. 44 east to Rte. 343, then along Rte. 343 east to the northern boundary of the Town of Dover Plains and east along the northern boundary of the Town of Dover Plains, to the borderline of the State of Connecticut.
Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98 and the entirety of the City of Batavia.

WAGES
CLASS A: Automatic Concrete Spreader (CMI Type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Belt Placer (CMI Type); Blacktop Plant (automated); Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Concrete Curb Machine (self-propelled slipform); Concrete Pump (8" or over); Dredge; Dual Drum Paver; Excavator; Front End Loader (4 cu. yd & over); Gradall; Head Tower (Sauerman or Equal); Hoist (shaft); Hoist (two or three Drum); Log Chipper/Loader (self-feeder); Maintenance Engineer (shaft and tunnel); any Mechanical Shaft Drill; Mine Hoist; Mining Machine(Mole and similar types); Mucking Machine or Mole; Overhead Crane (Gantry or Straddle Type); Pile Driver; Power Grader; Remote Controlled Mole or Tunnel Machine; Scraper; Shovel; Side Boom; Slip Form Paver (If a second man is needed, they shall be an Oiler); Tripper/Maintenance Engineer (shaft & tunnel); Tractor Drawn Belt-Type Loader; Tug Operator (manned rented equipment excluded); Tunnel Shovel

CLASS B: Automated Central Mix Concrete Plant; Backhoe (topside); Backhoe (track mounted, rubber tired); Backhoe (topside); Bituminous Spreader and Mixer, Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Cage Hoist; Central Mix Plant(non-automated); all Concrete Batching Plants; Compressors (4 or less exceeding 2,000 c.f.m. combined capacity); Concrete Pump; Crusher; Diesel Power Unit; Drill Rigs (tractor mounted); Front End Loader (under 4 cu. yd.); Grayco Epoxy Machine; Hoist (One Drum); Hoist (2 or 3 drum topside); Knuckle Boom material handler; Kolman Plant Loader & similar type Loaders (if employer requires another person to clean the screen or to maintain the equipment, they shall be an Oiler); L.C.M. Work Boat Operator; Locomotive; Maintenance Engineer (topside); Maintenance Grease Man; Mixer (for stabilized base-self propelled); Monorail Machine; Plant Engineer; Personnel Hoist; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above sub-grade); Sea Mule; Shotcrete Machine; Shovel (topside); Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Tunnel Locomotive; Vacuum Machine (mounted or towed); Welder; Winch; Winch Cat

CLASS C: A Frame Truck; All Terrain Telescoping Material Handler; Ballast Regulator (ride-on); Compressors (4 not to exceed 2,000 c.f.m. combined capacity; or 3 or less with more than 1200 c.f.m. but not to exceed 2,000 c.f.m.); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (4 or any type combination)); Concrete Pavement Spreaders and Finishers; Conveyor; Drill (core); Drill (well); Electric Pump used in conjunction with Well Point System; Farm Tractor with Accessories; Fine Grade Machine; Fork Lift; Grout Pump (over 5 cu. ft.); Gunite Machine; Hammers (hydraulic-self-propelled); Hydra-Spiker (ride-on); Hydra-Blaster (water); Hydro-Blaster; Motorized Form Carrier; Post Hole Digger and Post Driver; Power Sweeper; Roller grade & fill); Scarifer (ride-on); Span-Saw (ride-on); Submersible Electric Pump (when used in lieu of well points); Tamper (ride-on); Tie-Extractor (ride-on), Tie Handler (ride-on), Tie Inserter (ride-on), Tie Spacer (ride-on); Track Liner (ride-on); Tractor with towed accessories; Vibratory Compactor; Vibro Tamp, Well Point

CLASS D: Aggregate Plant; Cement & Bin Operator; Compressors (3 or less not to exceed 1,200 c.f.m. combined capacity); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (3 or less or any type or combination)); Concrete Saw (self-propelled); Form Tamper; Greaseman; Hydraulic Pump (jacking system); Junior Engineer; Light Plants; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Power Broom (towed); Power Heaterman (when used for production); Revinius Widener; Shell Winder; Steam Cleaner; Tractor

Per hour:	07/01/2022
Master Mechanic	$ 52.60
CLASS A	50.19
CLASS B	48.97
CLASS C	46.18
CLASS D	43.17

Additional $5.00 per hour for Hazardous Waste Work on a state or federally designated hazardous waste site where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection. Fringe benefits will be paid at the hourly wage premium.

CRANES:
Crane 1: All cranes, including self-erecting to be paid $4.00 per hour over the Class A rate.

Crane 2: All Lattice Boom Cranes and all cranes with a manufacturer's rating of fifty (50) ton and over to be paid $3.00 per hour over Class A rate.
Crane 3: All hydraulic cranes and derricks with a manufacturer's rating of forty nine (49) ton and below, including boom trucks, to be paid $2.00 per hour over Class A rate.

Crane 1	$ 54.19
Crane 2	53.19
Crane 3	52.19

SUPPLEMENTAL BENEFITS
Per hour:

$ 23.70
+ 9.35*

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY
See (B, B2, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
If a holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
WAGES:(1000) hours terms at the following percentage of Journeyman's Class B wage.

1st term	60%
2nd term	65%
3rd term	70%
4th term	75%

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman

7-158-832TL.

Painter — 07/01/2022

JOB DESCRIPTION Painter **DISTRICT** 2

ENTIRE COUNTIES
Cortland, Tompkins

WAGES
Per hour:

	07/01/2022	05/01/2023 Additional	05/01/2024 Additional
Painter	$ 26.64	$ 1.35*	$ 1.35*
Taper, Paperhangers, and Vinyl hangers	27.97	1.42*	1.42*

*To be allocated at a later date.

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
- Additional $ 1.10 per hour for Brush and Roll Epoxy (Solvent Base Only)
- Additional $ 0.60 per hour for Swing Scaffold, Boatswain chair, Spray helper, Steam cleaning acid and high pressure water, Power grinders with respirator
- Additional $ 0.60 per hour for Structural steel (buildings) defined as new or old construction where ceilings, walls or the steel itself is to be painted from open trusses which require climbing or crawling without the support of solid scaffolding or scaffolding starting at the floor or ground level.
- Additional $ 1.00 per hour for Spray Painting
- Additional $ 1.00 per hour for Steeple Jack (Over 100 feet)
- Additional $ 1.50 per hour for Spray Epoxy (Solvent Based)
- Additional $ 0.90 per hour for Sandblasting

NOTE - SEE BRIDGE PAINTER RATES FOR BRIDGES & TANKS

** IMPORTANT NOTICE - EFFECTIVE 04/01/2009 **
Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day.

NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	$ 22.24

OVERTIME PAY

See (B, *E2, F, R) on OVERTIME PAGE

*Saturday is also payable at the straight time rate if the employee misses work, except where a doctor or hospital's verification of illness is produced Monday through Friday when work was available to the employee. Saturday is not a make-up day when work is missed as a result of a Holiday.

If working 4 (four) 10 (ten) hour day schedule, Friday will be the makeup day.

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE
Overtime:	See (5, 6) on HOLIDAY PAGE

A Holiday that falls on a Sunday will be celebrated on Monday, a holiday that falls on a Saturday will be celebrated on Friday.

REGISTERED APPRENTICES

WAGES:

Painter: 750 hour terms at the Painter Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 18.00	$ 19.00	$ 20.00	$ 21.00	$ 22.00	$ 23.00	$ 24.00	$ 25.00

Taper: 750 hour terms at the following Journeyman Taper Apprentice wage rate:

1st	2nd	3rd	4th	5th	6th
$ 20.00	$ 21.00	$ 22.00	$ 23.00	$ 24.00	$ 25.00

ADDITIONAL AMOUNTS FOR SPECIFIC TYPES OF JOBSITE CONDITIONS (amount subject to any overtime premiums):
- Additional $ 1.10 per hour for Brush and Roll Epoxy (Solvent Base Only)
- Additional $ 0.60 per hour for Swing Scaffold, Boatswain chair, Spray helper, Steam cleaning acid and high pressure water, Power grinders with respirator
- Additional $ 0.60 per hour for Structural steel (buildings) defined as new or old construction where ceilings, walls or the steel itself is to be painted from open trusses which require climbing or crawling without the support of solid scaffolding or scaffolding starting at the floor or ground level.
- Additional $ 1.00 per hour for Spray Painting
- Additional $ 1.00 per hour for Steeple Jack (Over 100 feet)
- Additional $ 1.50 per hour for Spray Epoxy (Solvent Based)
- Additional $ 0.90 per hour for Sandblasting

SUPPLEMENTAL BENEFITS per hour:

Painter/Decorator:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 6.00	$ 7.00	$ 8.00	$ 9.10	$ 11.00	$ 11.00	$ 13.00	$ 14.00

Taper/Drywall Finisher:

1st	2nd	3rd	4th	5th	6th
$ 6.00	$ 7.00	$ 8.00	$ 10.00	$ 13.00	$ 14.00

Painter 07/01/2022

JOB DESCRIPTION Painter **DISTRICT** 3

ENTIRE COUNTIES

Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Cortland, Delaware, Erie, Genesee, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

WAGES

Per hour:	07/01/2022
Bridge	$ 41.06
Tunnel	41.06
Tank*	39.06

For Bridge Painting Contracts, ALL WORKERS on and off the bridge (including Flagmen) are to be paid Painter's Rate; the contract must be ONLY for Bridge Painting.

Tank rate applies to indoor and outdoor tanks, tank towers, standpipes, digesters, waste water treatment tanks, chlorinator tanks, etc. Covers all types of tanks including but not limited to steel tanks, concrete tanks, fiberglass tanks, etc.

Note an additional $1.50 per hour is required when the contracting agency or project specification requires any shift to start prior to 6:00am or after 12:00 noon.

SUPPLEMENTAL BENEFITS
Per hour:
$ 29.89

OVERTIME PAY
Exterior work only See (B, E4, F*, R) on OVERTIME PAGE.
All other work See (B, F*, R) on OVERTIME PAGE.
*Note - Saturday is payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following percentage of Journeyman's wage rate:

1st	2nd	3rd	4th	5th	6th
$ 24.00	$ 26.00	$ 28.00	$ 30.00	$ 34.00	$ 38.00

Supplemental benefits per hour:

1st	2nd	3rd	4th	5th	6th
$ 6.60	$ 6.95	$ 7.30	$ 7.65	$ 8.00	$ 8.35

3-4-Bridge, Tunnel, Tank

Painter - Metal Polisher — 07/01/2022

JOB DESCRIPTION Painter - Metal Polisher **DISTRICT** 8

ENTIRE COUNTIES
Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

	07/01/2022
Metal Polisher	$ 37.78
Metal Polisher*	38.80
Metal Polisher**	41.78

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2022
Journeyworker:	
All classification	$ 11.24

OVERTIME PAY
See (B, E, P, T) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6, 11, 15, 16, 25, 26) on HOLIDAY PAGE
Overtime: See (5, 6, 9, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:
One (1) year term at the following wage rates:

	07/01/2022
1st year	$ 16.00
2nd year	17.00
3rd year	18.00

1st year*	$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation
** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:
Per hour:

1st year	$ 7.99
2nd year	7.99
3rd year	7.99

8-8A/28A-MP

Plumber 07/01/2022

JOB DESCRIPTION Plumber **DISTRICT** 2

ENTIRE COUNTIES
Broome, Chenango

PARTIAL COUNTIES
Cortland: Only the Township of Marathon.
Delaware: Only the Townships of Andes, Bovina, Colchester, Davenport, Delhi, Deposit, Franklin, Hamden, Hancock, Harpersfield, Kortright, Masonville, Meredith, Sidney, Stamford, Tompkins and Walton.
Madison: Only the Township of Georgetown.
Otsego: Only the Townships of Burlington, Butternuts, Decatur, Edmeston, Hartwick, Laurens, Maryland, Milford, Morris, New Lisbon, Oneonta, Otego, Pittsfield, Unadilla, Westford and Worchester.
Tioga: Only the Townships of Newark Valley and Owego.

WAGES

Per hour:	07/01/2022	05/01/2023 Additional
Plumber	$ 38.23	$ 2.50
Steamfitter	38.23	2.50

Agency-mandated shift operations:

1. Shift work shall start no earlier than 6AM Monday and will conclude no later than 9AM Saturday (overtime premiums applicable after 8 hours in a shift).

2. Single irregular shiftwork, less than 3 consecutive days will be paid at the rate of time and one-half of the regular hourly rate.

3. 3 consecutive work days or more:
First Shift - No Premium (Starting 6AM-9AM)
Second Shift - Regular hourly rate plus 12%
Third Shift - Regular hourly rate plus 18%

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$14.45
	+16.49*

*This portion of the benefit is subject to the SAME PREMIUM as shown for overtime on projects over $100 million in total construction costs (including engineering & architecture).

OVERTIME PAY
See (B, E, Q, *V) on OVERTIME PAGE
*portion of supplemental benefits subject to V code when project cost is over one hundred million (including engineering & architecture).

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
When a Holiday falls on Sunday, it will be celebrated the following day. If the holiday falls on a Saturday, it will be observed that day unless so determined by the Federal Government to be celebrated on a different day.

REGISTERED APPRENTICES

WAGES: One year terms at the following percentage of Journeyman's wage.

1st.	2nd.	3rd.	4th.	5th.
50%	55%	60%	70%	85%

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 14.45 +8.10*
All other terms	$ 14.45 +12.49*

*This portion of the benefit is subject to the SAME PREMIUM as shown for overtime on projects over $100 million in total construction costs (including engineering & architecture).

2-112s-SF

Plumber 07/01/2022

JOB DESCRIPTION Plumber **DISTRICT** 6

ENTIRE COUNTIES
Chemung, Cortland, Onondaga, Schuyler, Tompkins

PARTIAL COUNTIES
Madison: Only the Townships of Sullivan, Cazenovia and DeRuyter.
Seneca: Only the Townships of Covert and Lodi.
Steuben: Only the Townships of Addison, Bath, Bradford, Campbell, Caton, Corning, Erwin, Hornby, Lindley, Pulteney, Rathbone, Thurston, Tuscarora, Urbana and Wayne.
Tioga: Only the Townships of Barton, Berkshire, Candor, Richford, Spencer, Nichols and Tioga.

WAGES

Per hour:	07/01/2022	05/01/2023 Additional
Plumber/Steamfitter	$ 39.51	$ 3.00*
Pipefitter/Welder/HVAC	39.51	
Refrigeration	39.51	

*To be allocated at a later date.

SINGLE IRREGULAR WORK SHIFT: Additional 15% premium added to the wages above for a single irregular work shift outside of normal working hours.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday. Friday may be used as a make-up day. NOTE - In order to use the '4 Day/10 Hour Work Schedule,' as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 26.40

*NOTE: $10.27 of the supplemental benefits are paid at the same premium as shown for overtime work performed at semi-conductor manufacturer and/or fabrication plants.

OVERTIME PAY
Time and one half for the 9th & 10th hours Monday thru Friday and first 10 hours on Saturday. All other overtime hours are double-time.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: If a holiday falls on Saturday, the holiday will be observed on the prior Friday. If a holiday falls on Sunday, it will be observed on the following Monday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of the journeyman's wage:

1st	2nd	3rd	4th	5th
50%	55%	60%	70%	85%

SUPPLEMENTAL BENEFITS per hour*:

1st	$ 12.50
2nd	23.06
3rd	23.43
4th	24.16
5th	25.27

*NOTE: Below is the portion of supplemental benefits paid at overtime premiums for work performed at semi-conductor manufacturer and/or fabrication plants:

1st	n/a
2nd	$ 8.58
3rd	$ 8.77
4th	$ 9.14
5th	$ 9.71

6-81-SF

Roofer 07/01/2022

JOB DESCRIPTION Roofer **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Franklin, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence

WAGES

Per hour:	07/01/2022	06/01/2023 Additional	06/01/2024 Additional
Roofer, Waterproofer	$ 31.25	$ 2.00*	$ 2.00*

Additional per hour:	
Green Roofing*	$ 0.25
Pitch Removal & Appl.	1.50
Asbestos Abatement	1.50
Irregular Shift(s)**	4.00

*To be allocated at a later date.

NOTES:
Does not include metal flashing, gravel stop and metal roofing; see Sheetmetal Worker wage schedule.
* Green Roofing is any component of green technology or living roof above the roof membrane. Including but not limited to the fabric, dirt and plantings.

** WHEN MANDATED BY THE OWNER OR CONTRACTING AGENCY, THERE IS AN ADDITIONAL PREMIUM FOR HOURS WORKED BEFORE 5:30AM AND AFTER 5:30PM.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	$ 24.85
Additional contribution on any Asbestos Abatement work.	0.75

OVERTIME PAY
See (B, E, E2*, Q) on OVERTIME PAGE
*NOTE - If a holiday falls in that week and 32 hours were worked, Saturday will be paid at 1 1/2 times the rate.

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
NOTE: When any of these holidays falls on Sunday, the following day shall be observed as a holiday.

REGISTERED APPRENTICES
WAGES per hour: 1000 hour terms at the following percentage of the Journeyman's wage:

1st term (0 to 999)	65%
2nd term (1000 to 1999)	70%
3rd term (2000 to 2999)	75%
4th term (3000 to 3999)	85%

Additional per hour:	
Green Roofing**	$ 0.25

Pitch Removal & Appl.	1.50
Asbestos Abatement	1.50

SUPPLEMENTAL BENEFITS per hour:

1st term	$ 18.73
2nd term	20.40
3rd term	23.85
4th term	24.85

Additional contribution on any Asbestos Abatement work $ 0.75

6-195

Sheetmetal Worker — 07/01/2022

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Chenango, Cortland, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, St. Lawrence

WAGES

Per hour:	07/01/2022	05/01/2023 Additional	05/01/2024 Additional
Sheetmetal Worker:		$ 1.51*	$ 1.26*
**(under $10 million)	$ 32.89		
**(over $10 million)	33.89		

**For total cost of Sheetmetal contract only.

*To be allocated at a later date.

TO INCLUDE METAL STANDING SEAM ROOFING, METAL ROOF FLASHINGS, AND GRAVEL STOP.

SUPPLEMENTAL BENEFITS
Per hour:

Journeyman	$ 21.47 plus 3% of hourly wage paid

NOTE: The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
When any holiday falls on a Saturday, the Friday before such holiday shall be recognized as the legal holiday. Any holiday falling on Sunday, the following Monday shall be recognized as the legal holiday.

REGISTERED APPRENTICES
WAGES per hour: One year terms at the following percentage of Journeyman's wage.

1st	2nd	3rd	4th	5th
45%	55%	65%	75%	85%
$ 14.80*	$ 18.09	$ 21.38	$ 24.67	$ 27.96

*Note: subject to change due to any minimum wage increase.

SUPPLEMENTAL BENEFITS per hour:

$ 12.80*	$ 13.77*	$ 14.72*	$ 16.72*	$ 17.69*

*Plus 3% of hourly wage paid. The 3% is based on the hourly wage paid, straight time or premium rate.

6-58

Sprinkler Fitter — 07/01/2022

JOB DESCRIPTION Sprinkler Fitter **DISTRICT** 1

ENTIRE COUNTIES

Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Washington, Wayne, Wyoming, Yates

WAGES

Per hour	07/01/2022
Sprinkler Fitter	$ 38.15

SUPPLEMENTAL BENEFITS

Per hour	
Journeyperson	$ 27.68

OVERTIME PAY
See (B, E, Q) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES
Wages per hour

One Half Year terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 18.30	$ 20.34	$ 22.12	$ 24.15	$ 26.19	$ 28.22	$ 30.25	$ 32.29	$ 34.32	$ 36.35

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
$ 8.37	$ 8.37	$ 19.76	$ 19.76	$ 20.01	$ 20.01	$ 20.01	$ 20.01	$ 20.01	$ 20.01

1-669

Teamster - Building — 07/01/2022

JOB DESCRIPTION Teamster - Building **DISTRICT** 6

ENTIRE COUNTIES
Broome, Cayuga, Cortland, Delaware, Onondaga, Seneca, Tompkins, Yates

PARTIAL COUNTIES
Allegany: Only the Townships of Almond, Burns, and Alfred.
Chenango: Only the Townships of Afton, Bainbridge, Coventry, Greene, Guilford, Oxford and Smithville.
Madison: Only the Townships of Cazenovia, DeRuyter, Fenner, Georgetown, Lenox, Nelson and Sullivan.
Oswego: All Townships except Redfield, Boylston and Sandy Creek.
Otsego: Only the Townships of Butternuts, Laurens, Maryland, Millford, Morris, Oneonta, Otego, Unadilla, and Worchester.
Steuben: Only the Townships of Prattsburg, Canisteo, Fremont, Cohoctan, Dansville, Hornell, Hartsville, Greenwood, West Union, Troupsburg, and Jasper.
Tioga: Only the Townships of Berkshire, Candor, Newark Valley, Nichols, Owego, Richford, and Tioga. All territory east of Nichols/Smithboro to Broome County, within State of New York.

WAGES
GROUP A: Straight Trucks
GROUP B: Tractor Trailer, Farm Tractor, Fuel Truck.
GROUP C: Euclid.
GROUP D: On site Mechanic.

Per hour:	07/01/2022
Building: (under $ 5 million*)	
GROUP A	$ 24.43
GROUP B	24.43
GROUP C	24.43
GROUP D	24.43
Building: (over $ 5 million*)	
GROUP A	$ 25.48
GROUP B	25.58

GROUP C	25.83
GROUP D	25.63

* Total project cost including General Construction, Plumbing, HVAC and Electrical

SUPPLEMENTAL BENEFITS
Per hour:

(under $5 million*)	$ 28.63
(over $5 million*)	29.37

* Total project cost including General Construction, Plumbing, HVAC and Electrical

OVERTIME PAY
(D, O) on OVERTIME PAGE

HOLIDAY
Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

6-317

Teamster - Heavy&Highway — 07/01/2022

JOB DESCRIPTION Teamster - Heavy&Highway **DISTRICT** 6

ENTIRE COUNTIES
Cayuga, Cortland, Seneca, Tompkins, Yates

PARTIAL COUNTIES
Allegany: Only the Townships of Almond, Alfred, Burns and West Almond.
Steuben: Only the Townships of Canisteo, Cohocton, Dansville, Freemont, Greenwood, Hartsville, Hornell, Jasper, Prattsburg, Troupsburg, and West Union.

WAGES
GROUP 1: Warehousemen*, Yardmen*, Truck Helpers, Pickups, Panel Trucks, Flatboy Material Trucks (straight jobs), Single Axle Dump Trucks, Dumpsters, Material Checkers & Receivers*, Greasers, Truck Tiremen, Mechanics Helpers and Parts Chasers, Tandems & Batch Trucks, Mechanics, Semi-Trailers, Low-boy Trucks, Asphalt Distributor Trucks and Agitator, Mixer Trucks and Dumpcrete type vehicles, Truck Mechanic, Fuel Trucks.

*NOTE: Applies when a temporary warehouse structure is built/utilized specifically for a public work project.

GROUP 2: Specialized Earth Moving Equipment-Euclid type, or similar off-highway equipment, where not self-loading, Straddle (Ross) Carrier, and self-contained concrete mobile truck, Off-highway Tandem Back-Dump, Twin Engine Equipment and Double-Hitched Equipment where not self-loading.

Per hour:	07/01/2022	07/01/2023	07/01/2024
GROUP 1	$ 30.41	$ 32.24	$ 34.21
GROUP 2	30.61	32.44	34.41

NOTE: For all work bid, there shall be a twelve month carryover of the rates in effect at the time of the bid.

Four (4), ten (10) hour days may be worked at straight time during a week.
NOTE - In order to use the '4 Day/10 Hour Work schedule', as your normal schedule, you must submit an 'Employer Registration for Use of 4 Day/10 Hour Work Schedule,' form PW30.1; and there must be a dispensation of hours in place on the project. If the PW30.1 is not submitted you may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2022	07/01/2023	07/01/2024
Journeyman	$ 27.65	$ 28.32	$ 28.85

OVERTIME PAY
See (B, B2, E2, J) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

6-317(Syr)

Welder — 07/01/2022

JOB DESCRIPTION Welder **DISTRICT** 1

ENTIRE COUNTIES

Albany, Allegany, Bronx, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Kings, Lewis, Livingston, Madison, Monroe, Montgomery, Nassau, New York, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Oswego, Otsego, Putnam, Queens, Rensselaer, Richmond, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

Per hour 07/01/2022

Welder: To be paid the same rate of the mechanic performing the work.*

*EXCEPTION: If a specific welder certification is required, then the 'Certified Welder' rate in that trade tag will be paid.

OVERTIME PAY

HOLIDAY

1-As Per Trade

Overtime Codes

Following is an explanation of the code(s) listed in the OVERTIME section of each classification contained in the attached schedule. Additional requirements may also be listed in the HOLIDAY section.

NOTE: Supplemental Benefits are 'Per hour worked' (for each hour worked) unless otherwise noted

(AA)	Time and one half of the hourly rate after 7 and one half hours per day
(A)	Time and one half of the hourly rate after 7 hours per day
(B)	Time and one half of the hourly rate after 8 hours per day
(B1)	Time and one half of the hourly rate for the 9th & 10th hours week days and the 1st 8 hours on Saturday. Double the hourly rate for all additional hours
(B2)	Time and one half of the hourly rate after 40 hours per week
(C)	Double the hourly rate after 7 hours per day
(C1)	Double the hourly rate after 7 and one half hours per day
(D)	Double the hourly rate after 8 hours per day
(D1)	Double the hourly rate after 9 hours per day
(E)	Time and one half of the hourly rate on Saturday
(E1)	Time and one half 1st 4 hours on Saturday; Double the hourly rate all additional Saturday hours
(E2)	Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E3)	Between November 1st and March 3rd Saturday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather, provided a given employee has worked between 16 and 32 hours that week
(E4)	Saturday and Sunday may be used as a make-up day at straight time when a day is lost during that week due to inclement weather
(E5)	Double time after 8 hours on Saturdays
(F)	Time and one half of the hourly rate on Saturday and Sunday
(G)	Time and one half of the hourly rate on Saturday and Holidays
(H)	Time and one half of the hourly rate on Saturday, Sunday, and Holidays
(I)	Time and one half of the hourly rate on Sunday
(J)	Time and one half of the hourly rate on Sunday and Holidays
(K)	Time and one half of the hourly rate on Holidays
(L)	Double the hourly rate on Saturday
(M)	Double the hourly rate on Saturday and Sunday
(N)	Double the hourly rate on Saturday and Holidays
(O)	Double the hourly rate on Saturday, Sunday, and Holidays
(P)	Double the hourly rate on Sunday
(Q)	Double the hourly rate on Sunday and Holidays
(R)	Double the hourly rate on Holidays
(S)	Two and one half times the hourly rate for Holidays

(S1)	Two and one half times the hourly rate the first 8 hours on Sunday or Holidays One and one half times the hourly rate all additional hours.
(T)	Triple the hourly rate for Holidays
(U)	Four times the hourly rate for Holidays
(V)	Including benefits at SAME PREMIUM as shown for overtime
(W)	Time and one half for benefits on all overtime hours.
(X)	Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

Holiday Codes

PAID Holidays:

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

OVERTIME Holiday Pay:

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays. The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Following is an explanation of the code(s) listed in the HOLIDAY section of each classification contained in the attached schedule. The Holidays as listed below are to be paid at the wage rates at which the employee is normally classified.

(1)	None
(2)	Labor Day
(3)	Memorial Day and Labor Day
(4)	Memorial Day and July 4th
(5)	Memorial Day, July 4th, and Labor Day
(6)	New Year's, Thanksgiving, and Christmas
(7)	Lincoln's Birthday, Washington's Birthday, and Veterans Day
(8)	Good Friday
(9)	Lincoln's Birthday
(10)	Washington's Birthday
(11)	Columbus Day
(12)	Election Day
(13)	Presidential Election Day
(14)	1/2 Day on Presidential Election Day
(15)	Veterans Day
(16)	Day after Thanksgiving
(17)	July 4th
(18)	1/2 Day before Christmas
(19)	1/2 Day before New Years
(20)	Thanksgiving
(21)	New Year's Day
(22)	Christmas
(23)	Day before Christmas
(24)	Day before New Year's
(25)	Presidents' Day
(26)	Martin Luther King, Jr. Day
(27)	Memorial Day
(28)	Easter Sunday

(29) Juneteenth

New York State Department of Labor - Bureau of Public Work
State Office Building Campus
Building 12 - Room 130
Albany, New York 12240

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

As Required by Articles 8 and 9 of the NYS Labor Law

Fax (518) 485-1870 or mail this form for new schedules or for determination for additional occupations.

This Form Must Be Typed

Submitted By: (Check Only One) ☐ Contracting Agency ☐ Architect or Engineering Firm ☐ Public Work District Office Date:

A. Public Work Contract to be let by: (Enter Data Pertaining to Contracting/Public Agency)

1. Name and complete address ☐ (Check if new or change)

Telephone: ( ) Fax: ( )
E-Mail:

2. NY State Units (see Item 5)

☐ 01 DOT
☐ 02 OGS
☐ 03 Dormitory Authority
☐ 04 State University Construction Fund
☐ 05 Mental Hygiene Facilities Corp.
☐ 06 OTHER N.Y. STATE UNIT
☐ 07 City
☐ 08 Local School District
☐ 09 Special Local District, i.e., Fire, Sewer, Water District
☐ 1O Village
☐ 11 Town
☐ 12 County
☐ 13 Other Non-N.Y. State (Describe)

3. SEND REPLY TO ☐ check if new or change)
Name and complete address:

Telephone:( ) Fax: ( )
E-Mail:

4. SERVICE REQUIRED. Check appropriate box and provide project information.

☐ New Schedule of Wages and Supplements.
APPROXIMATE BID DATE :

☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title _____
Description of Work _____
_____
Contract Identification Number _____
Note: For NYS units, the OSC Contract No. _____

6. Location of Project:
Location on Site _____
Route No/Street Address _____
Village or City _____
Town _____
County _____

7. Nature of Project - Check One:

☐ 1. New Building
☐ 2. Addition to Existing Structure
☐ 3. Heavy and Highway Construction (New and Repair)
☐ 4. New Sewer or Waterline
☐ 5. Other New Construction (Explain)
☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
☐ 7. Demolition
☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

☐ Construction (Building, Heavy Highway/Sewer/Water)
☐ Tunnel
☐ Residential
☐ Landscape Maintenance
☐ Elevator maintenance
☐ Exterminators, Fumigators
☐ Fire Safety Director, NYC Only
☐ Guards, Watchmen
☐ Janitors, Porters, Cleaners, Elevator Operators
☐ Moving furniture and equipment
☐ Trash and refuse removal
☐ Window cleaners
☐ Other (Describe)

9. Has this project been reviewed for compliance with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature

SEE PAGE TWO FOR LAWS RELATING TO PUBLIC WORK CONTRACTS

NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED ANY PUBLIC WORK CONTRACT

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: https://applications.labor.ny.gov/EDList/searchPage.do

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 07/22/2022

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	*****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL	*****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC	*****6775	ADVENTURE MASONRY CORP.		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC		AGOSTINHO TOME		405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		ANTONIO ESTIVEZ		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC	*****6683	ATLAS RESTORATION CORP.		35-12 19TH AVENUE ASTORIA NY 11105	08/02/2017	08/02/2022
DOL	NYC	*****2591	AVI 212 INC.		260 CROPSEY AVENUE APT 11GBROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	*****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		BIAGIO CANTISANI			06/12/2018	06/12/2023
DOL	DOL	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL		BRUCE P. NASH JR.		5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****0225	C&D LAFACE CONSTRUCTION, INC.		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025

DOL	DOL	*****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	*****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL		CANTISANI & ASSOCIATES LTD		442 ARMONK RD MOUNT KISCSO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CANTISANI HOLDING LLC			06/12/2018	06/12/2023
DOL	DOL		CARMEN RACHETTA		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	02/03/2025
DOL	DOL		CARMENA RACHETTA		8531 OSWEGO ROAD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****3812	CARMODY "2" INC			06/12/2018	06/12/2023
DOL	DOL	*****1143	CARMODY BUILDING CORP	CARMODY CONTRACTING AND CARMODY CONTRACTING CORP.	442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY CONCRETE CORPORATION			06/12/2018	06/12/2023
DOL	DOL		CARMODY ENTERPRISES, LTD.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY INC		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3812	CARMODY INDUSTRIES INC			06/12/2018	06/12/2023
DOL	DOL		CARMODY MAINTENANCE CORPORATION		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY MASONRY CORP		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	AG		CESAR J. AGUDELO		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER J MAINI		19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL		CHRISTOPHER PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****1927	CONSTRUCTION PARTS WAREHOUSE, INC.	CPW	5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	NYC		DALJIT KAUR BOPARAI		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	AG		DEBRA MARTINEZ		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	NYC		DIMITRIOS TSOUMAS		35-12 19TH AVENUE ASTORIA NY 11105	08/02/2017	08/02/2022
DOL	DOL		DOMENICO LAFACE		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023

DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL		EAST COAST PAVING		2238 BAKER RD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	NYC	*****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		FRANK BENEDETTO		19 CATLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL	*****4722	FRANK BENEDETTO AND CHRISTOPHER J MAINI	B & M CONCRETE	19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	NYC		FRANK MAINI		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		GEOFF CORLETT		415 FLAGGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		GIOVANNI LAFACE		8531 OSWEGO RD BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	NYC	*****3164	GLOBE GATES INC	GLOBAL OVERHEAD DOORS	405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	NYC		GREAT ESTATE CONSTRUCTION, INC.		327 STAGG ST BROOKLYN NY 11206	10/10/2017	10/10/2022
DOL	DOL		GREGORY S. OLSON		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	*****3228	HEIGHTS ELEVATOR CORP.		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	DOL	*****5131	INTEGRITY MASONRY, INC.	M&R CONCRETE	722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		IRENE KASELIS		32 PENNINGTON AVE WALDWICK NJ 07463	05/30/2019	05/30/2024
DOL	DOL	*****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.A. HIRES CADWALLADER		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JAMES C. DELGIACCO		722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JAMES LIACONE		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		JAMES RACHEL		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027

NYSDOL Bureau of Public Work Debarment List 07/22/2022

Article 8

DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****5368	JCH MASONRY & LANDSCAPING INC.		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	AG		JOHN ANTHONY MASSINO		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JOHN F. CADWALLADER		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4612	JOHN F. CADWALLADER, INC.	THE GLASS COMPANY	P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN LUCIANO			05/14/2018	05/14/2023
DOL	DOL		JOHN MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	AG	*****0600	JOHNCO CONTRACTING, INC.		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JORI PEDERSEN		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		JOSE CHUCHUCA		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JOSEPH MARTINO		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	DOL		JOY MARTIN		2404 DELAWARE AVE NIGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KATIE BURDICK		2238 BAKER RD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****3490	L & M CONSTRUCTION/DRYWALL INC.		1079 YONKERS AVE YONKERS NY 10704	08/07/2018	08/07/2023
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LAVERN GLAVE		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022

DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	01/17/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	08/14/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	09/19/2017	09/19/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	08/14/2017	08/14/2022
DOL	DOL		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	01/17/2017	09/19/2022
DOL	AG	*****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
DOL	DA	*****4460	LONG ISLAND GLASS & STOREFRONTS, LLC		4 MANHASSET TRL RIDGE NY 11961	09/06/2018	09/06/2023
DOL	AG	*****4216	LOTUS-C CORP.		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL	*****2196	MAINSTREAM SPECIALTIES, INC.		11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DA		MANUEL P TOBIO		150 KINGS STREET BROOKLYN NY 14444	08/19/1998	08/19/2998
DOL	DA		MANUEL TOBIO		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	NYC		MAREK FABIJANOWSKI		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL		MASONRY CONSTRUCTION, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3333	MASONRY INDUSTRIES, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	NYC		MATINA KARAGIANNIS		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2023
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL		MAURICE GAWENO		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		MICHAEL LENIHAN		1079 YONKERS AVE UNIT 4YONKERS NY 10704	08/07/2018	08/07/2023
DOL	AG		MICHAEL RIGLIETTI		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024
DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	AG		MSR ELECTRICAL CONSTRUCTION CORP.		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DA	*****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023

DOL	DOL	*****3684	NATIONAL LAWN SPRINKLERS, INC.		645 N BROADWAY WHITE PLAINS NY 10603	05/14/2018	05/14/2023
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
DOL	DOL	*****1845	OC ERECTERS, LLC A/K/A OC ERECTERS OF NY INC.		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP		3 PARK CIRCLE MIDDLETOWN NY 10940	01/30/2018	01/30/2023
DOL	AG	*****7015	RCM PAINTING INC.		69-06 GRAND AVENUE 2ND FLOORMASPETH NY 11378	02/07/2018	02/07/2023
DOL	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
DOL	DOL		REGINALD WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL	*****9148	RICH T CONSTRUCTION		107 WILLOW WOOD LANE CAMILLUS NY 13031	11/13/2018	11/13/2023
DOL	DOL		RICHARD MACONE		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL	*****9148	RICHARD TIMIAN	RICH T CONSTRUCTION	108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	11/13/2018	11/13/2023
DOL	DOL		ROBBYE BISSESAR		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		RODERICK PUGH		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL	*****4880	RODERICK PUGH CONSTRUCTION INC.		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		ROSEANNE CANTISANI			06/12/2018	06/12/2023
DOL	DOL	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****7730	S C MARTIN GROUP INC.		2404 DELAWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	*****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RDPOMPEI NY 13138	07/16/2021	07/16/2026

DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC		SANDEEP BOPARAI		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	NYC	*****1130	SCANA CONSTRUCTION CORP.		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
DOL	DOL	*****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL	*****1961	SHANE BURDICK	CENTRAL TRAFFIC CONTROL, LLC.	2238 BAKER ROAD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE BURDICK		2238 BAKER ROAD GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE NOLAN		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****0816	SOLAR ARRAY SOLUTIONS, LLC		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	DOL	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPASTEFANOU, JR. A/K/A STEVE PAPASTEFANOU, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL		STEVE TATE		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		STEVEN MARTIN		2404 DELWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	NYC	*****5863	SUKHMANY CONSTRUCTION, INC.		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TALAILA OCAMPA		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL	*****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026

NYSDOL Bureau of Public Work Debarment List 07/22/2022

Article 8

DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	*****6789	TEST1000		P.O BOX 123 ALBANY NY 12044	03/01/2021	03/01/2026
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATION	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATION	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****6392	V.M.K CORP.		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	*****2426	VICKRAM MANGRU	VICK CONSTRUCTION	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLASTON NY 11363	01/14/2019	01/14/2024
DOL	NYC		VIKTAR PATONICH		2630 CROPSEY AVE BROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC		VITO GARGANO		1535 RICHMOND AVE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL	*****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		WHITE PLAINS CARPENTRY CORP		442 ARMONK RD	06/12/2018	06/12/2023
DOL	DOL		WILLIAM G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	*****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTING, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
DOL	DOL	*****4043	WINDSHIELD INSTALLATION NETWORK, INC.		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4730	XGD SYSTEMS, LLC	TDI GOLF	415 GLAGE AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	NYC		ZAKIR NASEEM		30 MEADOW ST BROOKLYN NY 11206	10/10/2017	10/10/2022
DOL	NYC	*****8277	ZHN CONTRACTING CORP		30 MEADOW ST BROOKLYN NY 11206	10/10/2017	10/10/2022

SECTION 00 85 20
PROJECT FORMS AND DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The forms listed in this section relate to the Division 1 Specification Sections.

1.2 SUMMARY

A. This Section lists the project forms used for administration of the project.

1.3 FORMS

A. SAFETY: Refer to Specification Section 01 06 40 – SAFETY REQUIREMENTS
   1. A1 - Task Hazard Analysis Form (THA)
   2. A2 - Visitors Assumption of Risk
   3. A3 – Confined Space Entry Permit
   4. A4 - Crane Operator Daily Inspection
   5. A5 – Crane Lift Plan
   6. A6 – Energized Electrical Work Permit
   7. A7 - Hot Work Permit
   8. A8 – Excavation Permit
   9. A9 – Line Break Permit
   10. A10 – Pressure Testing Plan
   11. A11 – Systems shutdown request form

B. SCHEDULE
   1. Three Week Schedule

C. CONSTRUCTION
   1. Submittal Cover Sheet – refer to Specification Section 01 33 00
   2. Request For Information (RFI's) are to be entered via Procore
   3. Contractors Daily Report are to be entered via Procore
   4. Standard Testing Record Form – Equipment
   5. Standard Testing Record Form – Piping
   6. Building Systems Training and Orientation

D. APPLICATION FOR PAYMENT
   1. Labor Rate Sheet
   2. TEMPLATE - Application And Certification For Payment, AIA Document G702/CMa and G703
   3. Affidavit And Waiver Of Lien
   4. Contractor's Affidavit Of Payment Of Debits and Claims, AIA G706
   5. Contractor's Affidavit Of Release Of Liens, AIA G706A
   6. Consent Of Surety To Final Payment, AIA G707
   7. Bond Acknowledgement
   8. Final release, Final Waiver Of Claims And Liens And Release Of Rights
   9. Final Release From Subcontractor Or Supplier, Final Waiver Of Claims And Liens And Release Of Rights

END OF SECTION

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

SUBMITTAL COVER SHEET

Project Title:
Homer CSD - 2021 Capital Improvement Phase 1

HUNT Project No.: 2503-036

Prime Contractor No.:

Prime Contractor: Name & Address:

Name of Preparer:

P.C. Tel. No.:

P.C. Fax No.:

Buildings where product will be installed:

Subcontractor:

Spec Sec. No.:

Spec. Paragraph No.:

Section Title:

Date of Submittal:

Resubmittal Date:

ACTION STAMP

Product Name:

Supplier:

Manufacturer:

Model/Item No.:

Product Data	☐	Shop Drawings	☐	Samples	☐	Test Reports	☐
Schedule	☐	Certification Letter	☐	Warranty	☐	Other	☐

CONTRACTOR'S COMMENTS INCLUDING ANY DEVIATION FROM CONTRACT DOCUMENTS

REVIEW COMMENTS

THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE PRIME CONTRACTOR IN ACCORDANCE WITH THE CONTRACT DOCUMENTS INCLUDING ARTICLE 3.2 AND ARTICLE 4 OF THE GENERAL CONDITIONS. THE PRIME CONTRACTOR ALSO CERTIFIES THAT ALL PRODUCTS/MATERIALS USED ON THIS PROJECT CONTAIN LESS THAN ONE PERCENT OF ASBESTOS BY WEIGHT. IT IS ALSO CERTIFIED THAT ALL PRODUCTS/MATERIALS ARE IN READINESS FOR SERVICE FOR THE INDICATED PROJECT TIMELINE.

Signature:

Date:_____

LECHASE

Task Hazard Analysis Form

STOP	COVID-19 Screening Questions
	Are any of the following symptoms present; Fever, chills, sore throat, loss of taste or smell, new cough or shortness of breath?
	Have you been in contact with anyone under quarantine or who tested positive for Covid-19?
	Have you tested positive for Covid-19?
	If you answered yes to any of these questions, you are not cleared to be on the project!

Project Name: _____

Jobsite Address (In Case of Emergency) _____

_____

Subcontractor: _____

Task to be performed: _____

Number of Employees for this task _____

Questions to ask for an effective THA	
1	What am I about to do?
2	How am I going to do it?
3	What do I need to do the job?
4	What are the hazards?
5	What preventative measures will I take?

Safety Access
Location of Fire Extinguishers:
Emergency Evacuation Area:
Location of Eyewash and First Aid Kit:

Please consider the following for work to be performed
☐ Does every crew member know how to use assigned tools & equipment?
☐ Does this work require special training?
☐ Do you need additional or special materials and tools to do the job?
☐ Do you need to review an SDS to proceed with this work?
☐ Is there adequate lighting and access?
☐ Is a shutdown of systems or equipment required?
☐ Are there occupied spaces adjacent or below?
☐ Are there power lines nearby? Overhead, buried, in slab, ceilings, or wall?
☐ Does work involve awkward positions, heavy or repetitive lifting?
☐ Is there any potential to impact existing Owner or other subcontractors?
☐ Are other subcontractors in my work area and can we work safely together?
☐ Is mobile equipment operator certified?
☐ Will weather affect the safety or quality of this work?

Consider use of or potential for the following	
☐ Ladders	☐ Barricades/ Signage
☐ Scaffolding	☐ Welding/Cutting/Grinding
☐ Elevated work	☐ Traffic Control
☐ Fall Protection PPE/PFAS	☐ Hearing Protection
☐ Confined Space	☐ Heat/Cold Factors
☐ Critical Lift Plans, Rigging	☐ SDS/ HazCom
☐ Excavations	☐ Pressurized Systems
☐ Electrical Hazards, Lock-Out/ Tag-Out	☐ Shield, Welding PPE, Goggles
☐ Life Saving Commitments	☐ Other:_____

Will the task require a deviation from any safety policy?
☐ Yes ☐ No

I confirm by my name below, that I have attended a briefing on the requirements of the attached THA and agree to perform the work in the manner detailed on it.
I confirm that copies of the relevant Permits, SDS's, Isolation Plans, etc. have been reviewed.

	PRINT NAME	CRAFT/TRADE	COVID-19 Symptoms/Contact (Y/N)		PRINT NAME	CRAFT/TRADE	COVID-19 Symptoms/Contact (Y/N)
1				8			
2				9			
3				10			
4				11			
5				12			
6				13			
7				14			

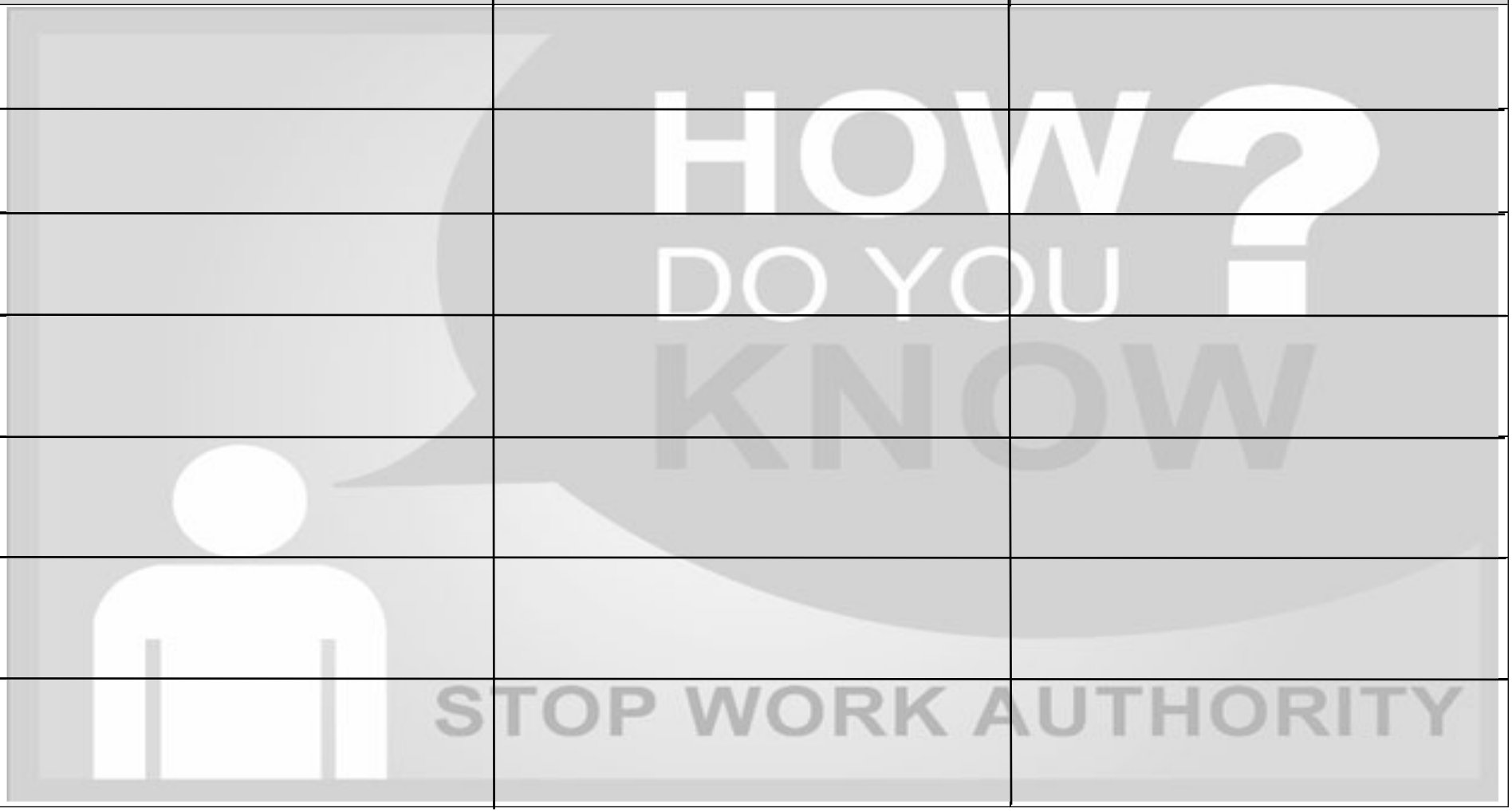
YOU ARE EMPOWERED TO STOP UNSAFE WORK!

Always *Validate and Verify* and ask *How Do You Know?*

NOTE: EACH TASK REQUIRES A SEPERATE TASK HAZARD ANALYSIS

If a deficiency in the plan is discovered, or if the task/condition changes, work shall stop and the current THA will be modified or a new one created. Additional Permits/Checklists are required for equipment, confined space, trenches, excavations, hot work, line breaks, lock-out/tag-out, cranes, CAZ, scaffolds, pressure test, etc. See your supervisor if unsure.

LIST STEPS to be performed	Hazards associated with each step	Required actions to eliminate or control hazard
1.		
2.		
3.		
4.		
5.		
6.		
7.		



This pre task plan was conducted by:

To be completed at end of shift:
Was anyone injured today?
☐ Yes ☐ No
If so, was it reported?
☐ Yes ☐ No

_____ _____

Foreman/Supervisor/Superintendent (Print Name) **Signature**

_____ _____

LeChase Management (Print Name) **Signature**

Visitor's Assumption of
Risk, Release and
Indemnification Agreement

WHERAS, I, _____

Have requested of _____, the Owner of the premises

Located at _____ (the "Premises")

And the Owner's Construction Manager, LeChase Construction, permission to be allowed on the Premises,

AND WHEREAS, I have been advised that, to grant this request involves serious hazards to me, including risk of personal injury due to the existence of construction and other activities at the Premises, but I still desire permission to enter the Premises,

NOW THEREFORE, or good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and to induce the Owner of the Premises and LeChase Construction to give me permission to be allowed on the Premises, to the maximum extent permitted by law, I, before myself, my heirs, my executors, my administrators, my successors and/or my assigns (collectively and individually, the "Releasors"), hereby: (1) assume all the risks and hazards attendant upon my entry on and my presence at the Premises; (2) release the Owner of the Premises, LeChase Construction, LeChase Construction's and/or the Owner's subcontractors of any tier, and all officers, employees, agents, personal representatives, parents, subsidiaries, affiliates, successors and assigns of the foregoing parties (collectively and individually, the "Releasees") from and against any and all actions, causes of action, suits, claims, rights, damages, losses, expenses or demands of any kind or nature whatsoever, which I or the Releasors can or might have as a result of or arising out of my presence on or about the Premises, including, but not limited to, claims for any personal injury or death, which I, the Releasors or any person on the Premises under this permission may suffer or sustain' and (3) agree to indemnify and hold harmless the Releasees of, from and against any and/or all loss, costs, claims, suits, damages and judgments (including attorney's fees and disbursements) of any kind or nature whatsoever, however caused, including, but not limited to, those for property damage and bodily injury, including death, arising out of or in connection with my presence on or about the Premises.

_____

Signature

_____

Type or Print Name

_____

Date

This is an important document that may affect your rights.
Read it carefully before signing.

CONFINED SPACE ENTRY PERMIT

Job Name:	Job Number:	Company:	Permit #:
Entry Supervisor or Person Requesting Permit:			

Location & Description of Confined Space:	
Purpose of Entry:	
Names of Authorized Entrants:	
Names of Attendants:	
Names of Entry Supervisors:	
Initials of each entry supervisor authorizing entry:	

Permit Begins: Date: _____ Time: _____ AM/PM **Permit Expires:** Date: _____ Time: _____ AM/PM

METHOD OF COMMUNICATION Describe:

EQUIPMENT REQUIRED FOR ENTRY

Hard Hats	YES	NO
Coveralls	YES	NO
Boots	YES	NO
Safety Glasses	YES	NO
Safety Goggles	YES	NO
Face Shield	YES	NO
Ear Protection	YES	NO
Encapsulated Suit	YES	NO
Gloves	YES	NO
TYPE:		
Lighting	YES	NO
TYPE:		
Lockout Devices	YES	NO
Ventilation (mechanical)	YES	NO
Warning Lights	YES	NO
Fire Extinguisher	YES	NO
Ventilation/Blower	YES	NO
Non-sparking Tools	YES	NO
Rescue equipment	YES	NO
Other:_____	YES	NO
Other:_____	YES	NO
Special Instructions	YES	NO
List:		

RESPIRATORS REQUIRED FOR ENTRY

ARE RESPIRATORS REQUIRED? YES NO
If YES What Type: _____
Have Employees Been Trained/Fit Tested/ Med. Evaluation? **YES NO**
AIR-PURIFYING: Half-Mask: _____ Full-Face: _____
Type of Filters: _____
AIR-SUPPLIED: _____and/or _____and/or _____
Air Bottles Compressor Egress Bottles
SELF-CONTAINED BREATHING APPARATUS (SCBA): _____
*** NOTE: Air-supplied respirators with egress bottles or SCBA respirators are required for atmospheres that are Immediately Dangerous To Life or Health (IDLH)**
List any special:
1. Entry Conditions:
2. Training Required:
3. MSDS reviewed:
4. Chemicals in the area:

RESCUE EQUIPMENT REQUIRED FOR ENTRY

SCBA	YES	NO
Harness/Lifeline	YES	NO
Wristlets	YES	NO
Tripod/Manlift	YES	NO
Winch	YES	NO
First-Aid Kit	YES	NO
Stretcher	YES	NO
Other:		

Emergency Services:
_____
Identify
_____
Method of Communication
_____
Phone Number

ACCEPTABLE ENTRY CONDITIONS

Oxygen: **19.5 - 23.5%**	Flammables/Combustibles **Below 10% LEL**	Other:
Hydrogen Sulfide **0-10 PPM TLV-TWA**	Carbon Monoxide: **0 – 10 PPM TLV-TWA**	Other:

TESTING AND MONITORING CHECKLIST

Make, Model & Serial # of testing Equipment:

Date Equipment Calibrated:	Intermittent Testing						Continuous Monitoring		
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9
Date:									
Time:									
Oxygen	%	%	%	%	%	%	%	%	%
LEL	%	%	%	%	%	%	%	%	%
CO	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
H2S	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Toxic:									
_____									
_____									
Tester Initials:									

HOT WORK PERMIT

Is Hot Work Permit Required? **YES NO** | If **YES**, Is it attached to this Permit? **YES NO**

SIGNATURE OF PERSON AUTHORIZING ENTRY:

Date: **Time:**

CANCELLATION OF PERMIT **Date:** **Time:**
Cancelled By: (signature)
Reason Permit was Canceled

CONFINED SPACE ENTRY PERMIT

Standby Hole Watch Instructions

You should be thoroughly familiar with the following duties when you assume the responsibilities for a person or persons working inside a vessel or confined space. If you have questions, please see your supervisor.

Your Primary Responsibilities Are:

1. Safety of personnel working in the vessel or confined space.
2. Maintaining the conditions and requirements listed on the work permit.
3. Evacuating the vessel if you observe any condition which you consider hazardous.
4. Get help if an emergency develops. **Never attempt to enter a vessel or confined space, even in an emergency.**

(The circumstances and conditions of the job will determine the safety requirements and what your duties will be. The following duties are basic to all confined space work.**)**

General Requirements for Watch Persons

1. Items needed by watch personnel: Red or Orange vest and hand held air horn.
2. **THA** to be done on confined space work and signed off by crew. **Permit** to be read to crew and posted with THA at site.
3. **Do Not** leave your assignment while personnel are inside. (The only exception is in an emergency to get help. If you leave for any other reason, have all personnel evacuate the confined space or have a qualified person relieve you.)
4. **Be Alert** to surroundings and anticipate and/or prevent any condition that maybe hazardous.
5. Stay in constant communication or visual contact with personnel in confined space. If you are required to have respiratory equipment and lifelines, be sure you know how to use this equipment.
7. Prevent any interference of air or lifelines. All other lines are to enter through different entrance than personnel entry.
8. Upon completion of the job, clean and return all specialty equipment to its original location.
9. If you have any questions regarding your job, check with your supervisor or the safety department.

Entry/Exit Log

Date:______________ Location:____

Stand-by Person (s):
Entry Supervisor:
Craft Working in Confined Space:

Initial off when leaving confined space or on completion of work shift.

Name	(Print)	TIME IN	TIME OUT	TIME IN	TIME OUT	TIME IN	TIME OUT	TIME IN	Time Out	Initials

CRANE OPERATOR DAILY INSPECTION CHECKLIST			
Crane name/number	Crane type:	Crane capacity	Date of inspection:
Location:	Hour Meter: Start:_____ Stop:_____	Total hours operated:	
Operator's name:		Oiler's name:	

INSTRUCTIONS: *Check all items indicated. Inspect and indicate as satisfactory = S, Unsatisfactory = U, or not applicable = N/A*

Walk around inspection	**U**	**S**	**N/A**
Safety guards and plates			
Carrier frame, rotate base			
General hardware			
Wire rope			
Reeving			
Block			
Hook			
Sheeves			
Boom/Jib			
Gantry, pendants, boom stops			
Walks, ladders, handrails			
Wind locks, chocks, stops			
Tires, wheels, tracks			
Leaks-Fuel, oil, lube, water			
Radius indicator			
Outrigger/locking device			
Operation Inspection	**U**	**S**	**N/A**
Area safety			
Unusual noises			
Control Action			
Brakes/boom/load/ rotate			
Crane stability			
No load test			
Fleeting sheeve			
Limit switches			

Operator Cab Inspection	**U**	**S**	**N/A**
Gauges			
Warning & indicator lights			
Control/brakes			
Visibility			
Load rating charts			
Safety devices			
Emergency stops			
List/trim indicators			
Boom Angle/Radius Indicator			
Machinery House Inspection	**U**	**S**	**N/A**
Housekeeping			
Engine/Compressor			
Leaks - Fuel, lube, Oil, Water			
Lubrication			
Battery			
Lights			
Glass			
Clutch/Brake linings			
Electric motors			
Warning tags			
Fire extinguisher			

Comments:	
Operator's signature:	Supervisor's signature:

This checklist is based on EM 385-1-1, dated 3 September 1996. Use of this checklist is optional.

*** This checklist is from the US Corps of Engineers Safety & Health Requirements Manual (EM385-1-1 dated 15 September 2008). The date referenced above is the latest version of the checklist. ***

Appendix A: Crane Lift Plan

Crane Lift Plan

The Lift Plan may be valid for more than one day, as long as the configuration, location, maximum expected load, and maximum expected radius do not change from the Lift Plan as submitted. The responsible contractor must also provide a drawing, rendering, or 3D lift plan in addition to this form.

Date Submitted:	Proposed Date(s) For Lift Start: Complete:
Contractor/ Rigging Company:	
Crane Company:	Crane Operator:
Qualified Rigger:	Certified Signal Person:
Project:	Lift Location/Nearest Building(s):
Description of Lifting Work to be done	
Description of Lifting Scope: number of days _____, number of items to be picked_____	

1. Crane Information			
Make	Model	Capacity (tons)	
Crane Total Boom Length for this Configuration (Boom only)	Jib Used?	Length	Offset, if Used
Will outriggers be fully extended? _____If not, please explain setting:			
Will the Lift be based on 360° crane use and chart? _____If not, please explain:			
Maximum Boom Length Required	Maximum Pick Radius Required		

2. Load Characteristics		
Description of Max Load		
Dimensions of Max Load		Provide sketch
Weight of Max Load	How was this determined?	Please attach calculations
What is the maximum safe wind speed allowed for the picks covered under this lift plan?		
Will the load be unbalanced? ◯Y ◯N	If so, how will it be leveled during pick?	

3. Rigging Information
List Rigging Components (Please be specific – number, type, size, length, lift beam, capacity, etc.)
Worst Case Weight of Line, Block, and All Rigging:

4. Other Weights to be Considered to Determine Total Gross Load of Item to be Lifted	
a. Weight of Max Load	
b. Weight of Rigging:	
c. Added weight for factor of safety (minimum 20% of line a for uncertified weight)	
Total Gross Load:	

5. Crane Location/Clearances
Has Subcontractor developed a plan to control and protect vehicular and pedestrian traffic?
Will a full road blockage or partial road blockage be required?
Has PCC provided the contractor/crane company with locations of underground utilities or voids?
Has Subcontractor completed a to-scale elevation sketch or drawing depicting crane, adjacent structures, and load?
Has Subcontractor surveyed the area for overhead power lines and other hazards?
Will the load or any part of the crane be over any active or operating equipment, piping, etc.?
Will load be within 20 feet of active electrical lines, pipes, or process system at any time during pick?

6. Summary "Worst Case" Lift Scenario			
a. Max Pick Radius:	b. Total Gross Load:	c. Crane Chart Capacity @ Max Pick Radius:	d. % of Crane Capacity (line 6b/6c):

7. Critical Pick	Yes	No
Will crane(s) need to "walk" with loads?	☐	☐
Will pick require more than one crane?	☐	☐
Is total gross load more than 75% of rated capacity of crane at the max radius (line 6d)?	☐	☐
Will pick lift/carry personnel?	☐	☐
Will pick be made over occupied building or facility?	☐	☐

8. Attachments Provided				
Plot Plan w/Crane Location etc. ☐	Elevation Sketch ☐	Weight Calculations for Max Load ☐	Rigging List/Sketch ☐	Appropriate Crane Charts ☐
Traffic Control Plan ☐	Other information contractor/rigger or crane operator deems appropriate ☐			

Crane Company Competent Person	Signature: Date:
Subcontractor/Rigger Competent Person	Signature: Date:

June 2017 Rev.

ENERGIZED ELECTRICAL WORK PERMIT
PART I: TO BE COMPLETED BY THE REQUESTER:

Start Date:_____ Expected Completion Date:_____

Description of circuit/equip/job location:	
Description of work to be done:	
Justification for doing work on an energized system:	

Requester / Title: _____ Date: _____

PART II: TO BE COMPLETED BY THE ELECTRICALLY QUALIFIED PERSONS *DOING* THE WORK:

Detailed work plan (including hazards, conditions, mechanical, environmental, space obstructions, other voltages) – or attach as a separate sheet:

Means employed to restrict the access of unqualified persons from the work area:

_____

Locate and list emergency equipment readily accessible in the area (ie fire extinguisher, phone with emergency number, etc):

_____

Complete the tables below:

Flash Hazard (-1 to 4)		Shock Hazard (max V)		Working Distance	
Flash Boundary		Limited Approach		Glove Class, minimum	
Incident Energy (cal/cm^2)		Restricted Approach		PPE Class	

		Prohibited Approach			

Protective Equipment

☐ Natural Fiber Clothing	☐ Safety Glasses/Goggles	☐ Ear Plugs	☐ Leather Shoes
☐ FR Clothing	☐ Face Shield	☐ Leather Gloves	☐ Voltage-rated Shoes
☐ Voltage-rated Tools	☐ Balaclava Hood	☐ Voltage-rated Gloves	☐ Hard Hat
☐ Category III Meter	☐ 2 Layer Switching Hood	☐ Flashsuit	☐ Other

Other:_____

List Authorized Workers	**CPR Trained? Yes/No**	**Reviewed Approved THA? Initial if Yes**

PART III: APPROVAL(S) TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED:

Journeyman / Foreman/ Date: _____

LCS Project Mgr / Regional Safety Manager / Date:
_____

PART IV: POST WORK-FEEDBACK_____ (Worker Initials)

Close Out Date:_____

Return to Safety

HOT WORK PERMIT

All temporary operations involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to, Brazing, Cutting, Grinding, Soldering, Thawing, and Welding.

INSTRUCTIONS FOR FIRE SAFETY SUPERVISOR

1. **Verify precautions listed at right (or do not proceed with the work).**
2. **Complete page 1 and retain for job files.**

DATE _____ JOB NO. _____

LOCATION/BUILDING & FLOOR (Be Specific) _____

DESCRIPTION OF WORK BEING PERFORMED _____

NAME OF PERSON DOING HOT WORK _____

The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED: _____
(Permit Authorizing Individual)

SIGNED: _____
(Person doing Hot Work)

SIGNED: _____
(Fire Watch)

TIME
STARTED: Date:_____ Time:_____ AM/PM

Date:_____ Time:_____ AM/PM

FIRE WATCH SIGNOFF

Work area and all adjacent areas to which sparks and heat might have spread were inspected during the fire watch period and were found fire safe.

Signed:_____

FINAL CHECKUP

Work area was monitored for _____ hour(s) following Hot Work and found fire safe.

Signed: _____

OK	HOT WORK CHECKLIST	N/A
☐	Sprinklers and hose streams in service/operable,	☐
☐	Hot Work Equipment in good condition (e.g., power source, welding leads, torches, etc.)	☐
☐	Multi-purpose fire extinguisher and/or water pump can.	☐
	REQUIREMENTS WITHIN 35 FEET OF WORK	
☐	Dust, Lint, Debris, Flammable Liquids and oily deposits removed; floors swept clean.	☐
☐	Explosive atmosphere in area eliminated.	☐
☐	Combustible floors (e.g., wood, tile, carpeting) wet down, covered with damp sand or fire blankets.	☐
☐	Remove flammable and combustble material where possible. Otherwise protect with fire blankets, guards, or metal shields.	☐
☐	All wall and floor openings covered.	☐
☐	Walkways orotected beneath hot work.	☐
	WORK ON WALLS OR CEILINGS	
☐	Combustibles moved away from other side of wall.	☐
	WORK IN CONFINED SPACES	
☐	Confined space cleaned of all combustibles (example: grease, oil, flammable vapors).	☐
☐	Containers purged of flammable liquids/vapors.	☐
☐	Follow confined space guidelines.	☐
	FIRE WATCH/HOT WORK AREA MONITORING	
☐	Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.	☐
☐	Fire watch is supplied with an extinguisher, and/or water pump can, also making use of other extinguishers located throughout work area.	☐
☐	Fire watch is trained in use of this equipment and familiar with location of sounding alarm.	☐
☐	Fire watch may be required for opposite side of walls, above, and below floors and ceilings.	☐
	OTHER PRECAUTIONS TAKEN	
☐	_____	

_____

_____

_____

_____

LeCHASE CONSTRUCTION

Permit to Locate Utilities & Trench/Excavate

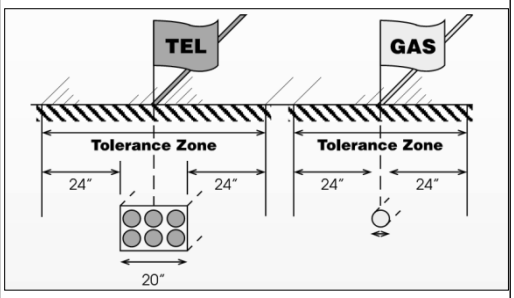
Section 1: Application For Permit

1. This permit must be completed and approved prior to the start of any digging/boring taking place.
2. Once approved a THA must be completed and reviewed with a LeChase supervisor prior to the start of activities.
3. Once trench/excavation complete and prior to anyone entering the excavation a documented inspection must take place.

Project Name:		Name of Subcontractor:	
Subcontractor Onsite Superintendent:		Phone:	
Subcontractor Competent Person:		Phone:	
Work Location:			
Permit Start Date:	Date:_____ Time:_____ am/pm	Permit Expiration Date:	Date:_____ Time:_____ am/pm
Description of activity and equipment involved:			

Section 2: Utility Locating

Item		Comments – Explanation Required
1.	Have as-built drawings, utility drawings and logistics drawings been reviewed to identify known utilities?	
2.	Has 811 been called?	811 Locate Number:
	Phone # used to call for Locate Number:	Date location was cleared:
3.	What utilities/services are located within the work space? ☐ Gas ☐ Electrical Services (Underground/overhead) ☐ Telecom/Data ☐ Water ☐ Storm Sewer ☐ Sanitary Sewer ☐ Steam ☐ Fuel ☐ Rail ☐ Other	
4.	Has GPRS located and marked known utilities? Are markings visible?	
5.	How will known utilities/services be exposed to visually confirm their location? ☐ Pot holing ☐ Vacuum Truck ☐ Other: _____ **After visually locating utilities STOP WORK and notify LeChase supervision. The subcontractor's competent person and LeChase must validate/verify and sign below.** Subcontractor Signature: LeChase Signature:	Hand digging is required if within 24" of marked utilities, to verify location.



Section 3: Planning Considerations

Item		Comments – Explanation Required
6.	Has an emergency action plan been developed including the location of utility shut offs?	
7.	What control measures will be utilized to prevent trench/excavation collapse - sloping, benching, shoring, etc.?	
8.	What protection for public/pedestrians/bystanders has been installed? (Fencing, jersey barricades, warning signage, etc.)	
9.	Proximity of local foot or vehicle traffic to excavation? Will additional vibration and/or pollutant monitoring be required?	
10.	What are the means of access/egress for the trench/excavation? (Access points required every 25' extending 3' above the excavation.)	
11.	Has the excavation been coordinated with other subcontractors?	

Other Special Precautions:

Subcontractor Signature/Date:	LeChase Signature/Date:

Line Break Permit

Task Overview	
Date (when work will be performed):	
Contractor Company Name:	
Contact Name:	
Contact Phone Number:	
Work Location:	
System to be Worked On:	

Task Specifics	
Hazards associated with the line break:	
Specific work activity to be performed:	
Method of line identification/ verification to be used:	
Method of line draining/purging to be used:	

Approvals	
Approved by:	
Date of Approval:	
Contractor Lead:	
Project Manager:	
Safety Representative:	
System Owner:	
Client Safety Representative:	

PRESSURE TESTING

PLAN, REQUEST & VERIFICATION

PLANNING & APPROVAL

CONTACT INFORMATION

Contractor Name: _____

Supervisor: _____

Phone: _____

Competent Person: _____

Phone: _____

PROPOSED TEST INFORMATION

☐ Hydrostatic ☐ Pneumatic

System Type: _____

Location: _____

Max Pressure: _____

Date/Time: _____

Provide explanation if proposed test info does not meet specs.

TEST SPECIFICATIONS

☐ Hydrostatic ☐ Pneumatic

Spec Section: _____

Test Pressure: _____

Test Duration: _____

PLANNING CHECKLIST

DESCRIPTION	YES	NO	REMARKS
Has the contractor reviewed the LeChase pressure testing procedure?	☐	☐	
Has an HHA (or approved alternate plan) been reviewed and approved? *Attach for reference.*	☐	☐	
Is the testing logistics plan attached? *Highlight system in YELLOW, exclusion zone in **RED**.*	☐	☐	
Does the proposed test meet the designer's specifications? *Attach for reference.*	☐	☐	
Is the pipe rating verified to be greater than the maximum pressure for this test?	☐	☐	
Are all gauge calibrations current?	☐	☐	
Will this test affect other trades or occupied spaces?	☐	☐	
Does this test require any supervision outside of normal working hours on the project?	☐	☐	
Have potential fluctuations in pressure been accounted for due to changing ambient temps?	☐	☐	
Has both the company supervisor and competent person reviewed this plan in detail?	☐	☐	

LECHASE APPROVALS

LCS Project Mgmt: _____ Date: _____

LCS Safety (if req'd): _____ Date: _____

SBU Lead (if req'd) _____ Date: _____

Once approved, LeChase will return hard copy of this document back to submitting company. Appropriate LeChase representative may proceed with scheduling test with applicable inspector/witness (if required).

PRESSURE TESTING

PLAN, REQUEST & VERIFICATION

LeCHASE

PRE-TEST VERIFICATION

Do not fill out this information until the PLANNING & APPROVAL portion above has been approved by LeChase. All questions below must be completed, and reviewed and approved by LeChase before energizing the system.

PRE-TEST CHECKLIST

DESCRIPTION	YES	NO	REMARKS
Has a THA been completed and signed by the LeChase team?	☐	☐	
Has all personnel on site been notified of the test?	☐	☐	
Has all necessary coordination taken place with other trades and/or the client?	☐	☐	
Have gauges, valves, appurtenances, etc. that are not rated for this test pressure been removed?	☐	☐	
Have all plugs, blanks, and fills been verified to have a rating higher than this test pressure?	☐	☐	
Has the contractor competent person walked the system with LCS to verify lockout/tagout devices?	☐	☐	
Has the applicable inspector/witness been notified and scheduled for this test?	☐	☐	
Are all barricades and signage in place at the exclusion zone?	☐	☐	
Has the competent person walked the entire system to verify it is ready for this test?	☐	☐	

Competent Person: _____ Date: _____

LECHASE APPROVALS

LCS Project Mgmt: _____ Date: _____

LCS Safety (if req'd) _____ Date: _____

Once approved by LeChase, the contractor may begin to energize the system.

TEST RESULTS

PRESSURE READINGS

Record all increases of pressure until the system reaches the maximum test pressure. **Date:**

INCREMENT	PRESSURE	TIME	REMARKS
Start Pressure			
1			
2			
3			
4			
5			
6			
7			

PRESSURE TESTING

PLAN, REQUEST & VERIFICATION

INCREMENT	PRESSURE	TIME	REMARKS
8			
9			
10			
11			
12			
13			
14			
15			
16			
Start (Test) Pressure			
Finish (Test) Pressure			

APPROVALS

Contractor: _____ Date: _____

Contractor Competent Person is required to sign acknowledging the above pressure readings are accurate and true.

POST-TEST VERIFICATION

Do not fill out this information until the TEST RESULTS portion above has been completed.

POST-TEST CHECKLIST

DESCRIPTION	YES	NO	REMARKS
Has the system been depressurized?	☐	☐	
Has all barricades and signage been removed at the exclusion zone?	☐	☐	
Have all test gauges, blanks, plugs, fills, etc. been removed?	☐	☐	
Have all lockout/tagout devices been safely removed?	☐	☐	

APPROVALS

Contractor: _____ Date: _____

LeChase: _____ Date: _____

Systems Shutdown / After Hours Work Requisition

Company Name _____
OWNER Name _____
Project Location (City/State) _____

Instructions
Complete this form one week prior to planned operation. Approval by the Company indicated above and the Owner indicated above must be received PRIOR to executing shutdowns or requesting after hours work.
The use of this form **does not in any way approve overtime work**.
This form is used to help schedule and plan construction activities around the project during off hours.

Date: _____

This request is for ☐ Systems Shutdown or ☐ After Hours Work Request.

Date of Work Activity: _____ Estimated Duration: _____

Work Areas: _____ Number of Men Required: _____

_____

_____

_____

DESCRIBE IN DETAIL —

Scope	
Plan	
Purpose	
Supervision Requirements	
Material Requirements	
Impacted Systems	
Impacted Field Trades	
Work to complete prior to shutdown	

Submitted by: _____ of _____
Superintendent Signature Prime Contractor Name

Additional Information is Attached: ☐ Yes ☐ No

APPROVALS

Enter Company Name

_____ _____
Signature *Date*

Enter OWNER Name

_____ _____
Signature *Date*

THREE WEEK LOOK AHEAD SCHEDULE

PROJECT: ____________________ TYPE OF WORK (TRADE): ____________________

CONTRACTOR: ____________________ DATE: ____________________

Activity ID	Activity Description	Duration (Days)	Start	Finish	/ /							/ /							/ /						
					M	T	W	TH	F	S	S	M	T	W	TH	F	S	S	M	T	W	TH	F	S	S

STANDARD TESTING RECORD FORM – EQUIPMENT

Project Name _____ Project Number _____

Project Location _____

Test Date _____ Temperature _____

EQUIPMENT / SERVICE TESTED

Name _____

Location / Description _____

_____

_____

_____

_____

TESTING METHOD

Method of Testing _____

Instrument Used _____

_____

TEST RESULTS

Time Test Started _____ Results _____

Time Test Completed _____ Results _____

Conclusion _____

Signatures

Witness _____ Representing _____

Witness _____ Representing _____

Remarks _____

_____

CONTRACTOR

Prime Contractor's Supervisor's Signature _____

STANDARD TESTING RECORD FORM – PIPING

Project Name _____ Project Number _____

Project Location _____

Test Date _____ Temperature _____

PIPELINE / SERVICE TESTED

Name _____

Location / Description _____

Piping & Material _____

Operating Pressure _____

Spec. Test Pressure _____

TESTING METHOD

Method of Testing _____

Instrument Used _____

Actual Test Pressure _____

TEST RESULTS

Time Test Started _____ Pressure _____

Time Test Completed _____ Pressure _____

Duration of Test _____ Pressure Rise _____ Pressure Drop _____

Signatures

Witness _____ Representing _____

Witness _____ Representing _____

Remarks _____

_____

CONTRACTOR

Prime Contractor Supervisor's Signature _____

Building Systems Training and Orientation

Type of System: _____

Project Name: _____

Project Number: _____

Training Date: _____

Instructor: _____

Training should occur as possible, but no later than the Certificate of Occupancy date.

ATTENDEE NAME – PRINT OR TYPE NAMES	ATTENDEE SIGNATURE

The above signature(s) on this form signify that the person(s) have been trained/instructed oriented on the items listed below:

ITEMS REVIEWED	

RATE SHEET

Prime Contract: _____

Trade / Subcontractor: _____

Trade Classification: _____

Experience: Circle One: Foreman Journeyman Apprentice

Effective Dates: _____ TO _____

Local Union #: _____

		Straight Time	Premium Time 1.5 x Base	Premium Time 2 x Base
Base Rate		$	$	$
Supplemental Benefit		$	$	$
Other - Specify: _____		N/A	N/A	N/A
	Subtotal	$		
Insurance & Taxes				
FICA	7.65% % of Base Rate	$	$	$
State Unemployment	____ % of Base Rate	$	$	$
Federal Unemployment	____ % of Base Rate	$	$	$
Workers Compensation	____ % of Base Rate	$	N/A	N/A
Liability Insurance	____ % of Base Rate	$	N/A	N/A
	Insurance & TaxesSubtotal	$	$	$
	Grand Total	$	$	$

Note:

- Overhead & Profit and Bond Costs will be applied to the Net Cost of the combination of labor and material for change order directives. **Do not include overhead & profit and bond costs in labor rate calculations.**

- Overhead & Profit and Bond Costs for Contract Allowances are **included in the base bid.**

- Separate Rate Sheets will need to be completed for Foreman, Journeyman, and Apprentice.

Overhead & Profit _____ % of Subtotal

Bond _____ % of Subtotal

AIA® Document G732™ – 2009

APPLICATION FOR PAYMENT EXAMPLE

Application and Certificate for Payment, *Construction Manager as Adviser Edition*

TO OWNER:	**PROJECT:** Jamesville Dewitt CSD	**APPLICATION NO:** 001	**DISTRIBUTION TO:**	
			OWNER	☐
		PERIOD TO:	CONSTRUCTION MANAGER	☐
			ARCHITECT	☐
FROM CONTRACTOR:	**VIA CONSTRUCTION MANAGER:**	**CONTRACT DATE:**	CONTRACTOR	☐
			FIELD	☐
		PROJECT NOS: / /		☐
	VIA ARCHITECT:			
CONTRACT FOR:				

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703™, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM	$0.00
2. NET CHANGES IN THE WORK	$0.00
3. CONTRACT SUM TO DATE *(Line 1 ± 2)*	$0.00
4. TOTAL COMPLETED AND STORED TO DATE *(Column G on G703)*	$0.00
5. RETAINAGE:	
a. 0 % of Completed Work *(Column D + E on G703:* $0.00 *)* =	$0.00
b. 0 % of Stored Material *(Column F on G703:* $0.00 *)* =	$0.00
Total Retainage *(Lines 5a + 5b, or Total in Column I on G703)*	$0.00
6. TOTAL EARNED LESS RETAINAGE *(Line 4 minus Line 5 Total)*	$0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT *(Line 6 from prior Certificate)*	$0.00
8. CURRENT PAYMENT DUE	$0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE *(Line 3 minus Line 6)*	$0.00

SUMMARY OF CHANGES IN THE WORK	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$0.00	$0.00
Total approved this month including Construction Change Directives	$0.00	$0.00
TOTALS	$0.00	$0.00
NET CHANGES IN THE WORK		$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:
County of:
Subscribed and sworn to before me this day of
Notary Public:
My Commission expires:

CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on evaluations of the Work and the data comprising this application, the Construction Manager and Architect certify to the Owner that to the best of their knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

CONSTRUCTION MANAGER:

By: _____ Date: _____

ARCHITECT: *(NOTE: If Multiple Prime Contractors are responsible for performing portions of the Project, the Architect's Certification is not required.)*

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

DRAFT

AIA® Document G703™ – 1992

SUMMARY PAGE EXAMPLE FOR FORMAT

Continuation Sheet

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.
In tabulations below, amounts are stated to the nearest dollar.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED		MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD					
	General Items								
	Unit Price Items (List out Unit Prices)								
	High School – Renovations SED#								
	High School – Additions SED#								
	High School – Site Work SED#								
	Intermediate / JR HS – Renovations SED#								
	Intermediate / JR HS – Site Work SED#								
	Elementary – Renovations SED#								
	Elementary – Site Work SED#								
	Alternates:								
	(List Each Alternate)								
	Contingency Allowance								
	Change Orders								
	(List Each Change Order)								
	GRAND TOTAL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0.00 %	$ 0.00	$ 0.00

PROJECT DETAIL EXAMPLE FOR FORMAT

CONTINUATION SHEET

AIA DOCUMENT G703

PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 1
APPLICATION DATE:
PERIOD TO:
PROJECT NO:

YOUR SCHOOL - CAPITAL IMPROVEMENTS

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
	GENERAL CONDITIONS								
	PERFORMANCE & PAYMENT BONDS								
	INSURANCE								
	MOBILIZATION								
	DEMOBILIZATION								
	FIELD SUPERVISION								
	SURVEYS & LAYOUT								
	TEMPORARY FACILITIES								
	PROJECT MEETINGS								
	PROJECT SAFETY								
	CLEANING-UP								
	SUBMITTALS / SHOP DRAWINGS / MOCKUPS								
	COORDINATION MODEL / DRAWINGS								
	PROJECT CLOSE-OUT								
	PUNCHLIST								
	O&M MANUALS / WARRANTIES								
	AS-BUILT DRAWINGS								
	TESTING / COMMISSIONING / TRAINING								
	UNIT PRICES								
	XX-1 Glove Bag Asbestos Removal								
	XX-2 ACM Floor Tile & Mastic Removal								
	CONTINGENCY ALLOWANCE								
	PCO# XXX								
	CHANGE ORDERS								
	CO#XXX								
	CO#XXX								

Not to Exceed .005% of contract value.

Total cost paid equally on a monthly basis based on duration of project.

Total cost paid equally on a monthly basis based on duration of project.

An amount of at least one percent (1%) of the Contract Value shall be carried for this line item, but not less than $25,000)

PROJECT DETAIL EXAMPLE FOR FORMAT

CONTINUATION SHEET

AIA DOCUMENT G703

PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 1
APPLICATION DATE:
PERIOD TO:
PROJECT NO:

YOUR SCHOOL - CAPITAL IMPROVEMENTS

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
	HIGH SCHOOL								
	SED# XX-XX-XX-XX-X-XXX-XXX								
	GYMNASIUM RENOVATION								
	Asbestos / PCB Abatement - Labor								
	Asbestos / PCB Abatement - Material								
	Selective Demo - Labor								
	Selective Demo - Material								
	Excavation & Fill - Labor								
	Excavation & Fill - Material								
	Concrete - Foundation - Labor								
	Concrete - Foundation - Material								
	Unit Masonry - Labor								
	Unit Masonry - Material								
	Finished Face Block								
	Masonry Restoration - Labor								
	Masonry Restoration - Material								
	Grouting								
	Structural Steel - Labor								
	Structural Steel - Material								
	Acoustic Metal Deck - Labor & Material								
	Acoustic Roof Deck - Labor & Material								
	Metal Stairs - Labor & Material								
	Metal Railings - Labor & Material								
	Misc Metal - Labor								
	Misc Metal - Material								
	Handrail Extensions - Labor								
	Handrail Extensions - Material								
	HIGH SCHOOL- AUDITORIUM RENOVATIONS								
	Selective Demolition								
	Ground Floor Plywood								
	Ground Floor Control Room								

Job Name: _____
LeChase Job No. _____

Job No._____

AFFIDAVIT AND WAIVER OF LIEN

OWNER _____
PROJECT _____
CONTRACTOR _____
REQUISITION # _____ **Date of Requisition** _____

AFFIDAVIT OF PAYMENTS MADE BY CONTRACTOR

STATE OF _____ **Date of Previous Requisition** _____
SS.:
COUNTY OF_____

(Name of Officers)_____, being duly sworn deposes and says:

I am the (Office Held) _____, of (Contractor) _____. I make this affidavit for the purpose of inducing _____ to make partial payment to us for work, labor, and services performed and/or materials furnished, as set forth on our requisition dated _____.

All claims for labor and materials by us or our subcontractors or vendors in connection with our work on this project to the date of our last preceding requisition have been paid, including any and all applicable sale or use taxes, and there are no liens or claims existent with respect thereto.

WAIVER OF LIEN

The undersigned contractor for One Dollar ($1.00) and any other good and valuable consideration received by it, hereby waives and releases all liens or rights of lien now existing for work, labor, or materials furnished to _____ 20_____, the date of the above referenced requisition with respect to the above designated project. The undersigned contractor further covenants and agrees that it shall not in any way claim or file a mechanic's lien against the premises on which the above designated project is located, or against any fund applicable thereto for any of the work, labor, or material heretofore furnished by it in connection with the improvements of said premises.

This release of liens is executed and delivered simultaneously with or after payment of the labor performed and materials furnished to the date of the above referenced requisition.

IN WITNESS WHEREOF, the undersigned has hereto set its hand and seal this _____th day of _____, 20_____.

_____
(Corporate Name)

_____day of _____, 20_____ By: _____
(Authorized Signature and Title)

_____
Notary Public

STATE OF NEW YORK)
COUNTY OF _____) BOND No. _____

CORPORATION

On this _____ day of _____, 20__, before me personally came

_____to me known, being sworn by me, did depose and say that he resides at

_____ that he is the

_____ of _____ the corporation

described in and which executed the above instrument; that he knows the said seal of such corporation; that the seal affixed to said instrument is such corporate seal; and that it was so affixed by order of the directors of said corporation;

and that he signed his name thereto by like order.

Sworn to and acknowledged on the above date, _____.

(Seal) _____

(Notary Public)

SURETY

On this _____ day of _____, 20__, before me personally came

_____to me known, being sworn by me, did depose and say that he resides at

_____ that he is the

Attorney – in - Fact of the _____ and knows the corporate seal

and that it was affixed thereto by authority of the Power of Attorney of said company; of which a certified copy is attached; and that he signed said instrument as an Attorney – in – Fact of said Company by like authority. Sworn to and

acknowledged on the above date, _____.

(Seal) _____

(Notary Public)

INDIVIDUAL

On this _____ day of _____, 20__, before me personally came

_____to me known and known to me to be the person described in and who executed the foregoing instrument and he thereupon acknowledges to me that he executed same.

Sworn to and acknowledged on the above date, _____.

(Seal) _____

(Notary Public)

LECHASE CONSTRUCTION. As Agent For_____

FINAL RELEASE
FINAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS

Date	_____	Contract Date	_____
Project	_____	Contract Price	_____
Address	_____	Net Extras and Deductions	_____
City	_____	Adjusted Contract Price	_____
State	_____	Amount Previously Paid	_____
Project #	_____	Balance Due - Final Payment	_____

Owner

The undersigned hereby acknowledges that the above Balance Due when paid represents payment in full for all labor, materials, etc., furnished by the below named Contractor or Supplier in connection with its work on the above project in accordance with the Contract made by it with the Owner.

Contractor's Name_____

In consideration of the amounts and sums previously received, and the payment of _____ $ _____ being the full and Final Payment amount due, the below named Contractor or Supplier does hereby waive and release the Owner and LeChase Construction from any and all claims and liens and rights of liens upon the premises described above, and upon improvements now or hereafter thereon, and upon the moneys or other considerations due or to become due from Owner or from any other person, firm or corporation, said claims, liens and rights of liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished by the below named Contractor or Supplier to the Project. The premises as to which said claims and liens are hereby released are identified as follows: _____

The undersigned further represents and warrants that he/she is duly authorized and empowered to sign and execute this waiver on his/her own behalf and on behalf of the company or business for which he/she is signing, that it has properly performed all work and furnished all materials of the specified quality per plans & specifications and in a good and workmanlike manner, fully and completely; that it has paid for all the labor, materials, equipment and services; that it has used or supplied; that it has no other outstanding and unpaid applications, invoices, retention's, holdbacks, expenses employed in the prosecution of work, chargeable or unbilled work or materials against Owner and/or LeChase Construction as of the date of the aforementioned last and final payment application; and that any materials which have been supplied or incorporated into the above premises were either taken from its fully-paid or open stock or were fully paid for and supplied on the last and final payment application or invoice.

The undersigned further agrees to defend, indemnify and hold harmless Owner and/or LeChase Construction for any losses or expenses (including without limitation reasonable attorney's fees) should any such claim, lien or right of lien be asserted by the below named Contractor or Supplier or by any of its or their laborers, materialmen or subcontractors.

In addition, for and in consideration of the amounts and sums received, the below named Contractor or Supplier hereby waives, releases and relinquishes any and all claims, rights or causes of action in equity or law whatsoever arising out of through or under the above mentioned Contract and the performance of work pursuant thereto.

The below named Contractor or Supplier further guarantees that all portions of the work furnished and installed are in accordance with the Contract and that the terms of the Contract with respect to this guarantee will remain in effect for the period specified in said Contract.

_____Day of _____, 20 ____

_____
Notary Public

_____
Corporation or Business Name

By _____

_____
Type Name and Title

LeChase Construction As Agent For_____

FINAL RELEASE FROM SUBCONTRACTOR OR SUPPLIER

FINAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS

Date_____ Contractor

Project_____ Contract Date

Address_____ Contract Price

City_____ Net Extras and Deductions

County_____ Adjusted Contract Price

State _____ Amount Previously Paid

Owner_____ Balance Due-Final Payment

Construction Manager LeChase Construction

The undersigned hereby acknowledges that the above Balance Due when paid represents payment in full for all labor, materials, etc., furnished by the below named Subcontractor or Supplier in connection with its work on the above Project in accordance with the Contract made by it with the above named Contractor.

In consideration of the amounts and sums previously received, and the payment of $ _____ being the full and Final Payment amount due, the below named Subcontractor or Supplier does hereby waive and release Contractor, Owner and Construction Manager from any and all claims, liens and rights of liens upon the premises described above, and upon improvements now or hereafter thereon, and upon the monies or other considerations due or to become due from Contractor or from any other person, firm or corporation, said claims, liens and rights of liens being on account of labor, service, materials, fixtures or apparatus heretofore furnished by the below named Subcontractor or Supplier to the Project. The premises as to which said claims and liens are hereby released are identified as follows:

The undersigned further represents and warrants that he/she is duly authorized and empowered to sign and execute this waiver on his/her own behalf and on behalf of the company or business for which he/she is signing; that it has properly performed all work and furnished all materials of the specified quality per plans and specifications and in a good and workmanlike manner, fully and completely; that it has paid for all the labor, materials, equipment and services that it has used or supplied, that it has no other outstanding and unpaid applications, invoices, retentions, holdbacks, expenses employed in the prosecution of work, chargebacks or unbilled work or materials against Contractor as of the date of the aforementioned last and final payment application; and that any materials which have been supplied or incorporated into the above premises were either taken from its fully-paid or open stock or were fully paid for and supplied on the last and final payment application or invoice.

The undersigned further agrees to defend, indemnify and hold harmless Contractor, Owner and/or Construction Managers for any losses or expenses (including without limitation reasonable attorneys' fees) should any such claim, lien or right of lien be asserted by the below named Subcontractor or Supplier or by any of its or their laborers, materialmen or subcontractors.

In addition, for and in consideration of the amounts and sums received, the below named Subcontractor or Supplier hereby waives, releases and relinquishes any and all claims, rights or causes of action in equity or law whatsoever arising out of through or under the above mentioned Contract and the performance of work pursuant thereto.

The below named Subcontractor or Supplier further guarantees that all portions of the work furnished and installed are in accordance with the Contract and that the terms of the Contract with respect to this guarantee will remain in effect for the period specified in said Contract.

Sworn to before me this

_____Day of_____20__

_____
Notary Public

_____
Corporation or Business Name
By
Subcontractor or Supplier

SECTION 01 06 40
SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 PRIME CONTRACTOR RESPONSIBILITIES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section and are requirements of all Prime Contractors, unless otherwise specified. These Contractor Safety Responsibilities ("Safety Responsibilities" or "Terms and Conditions") are prerequisites and mandated for any work performed for Homer Central School District ("Owner") on the Capital Project ("Project") project site. These Prime Contractor Safety Responsibilities are binding for all Prime Contractors ("Prime Contractor") to which the Owner issues a Prime Contract (the "Prime Contract").

B. In these Safety Responsibilities:

1. "Owner refers to the Owner or its affiliate, as applicable.

2. "Prime Contractor" refers to the first-tier Prime Contractor holding the Prime Contract and all persons and Subcontractors at any tier who are responsible to that Prime Contractor, directly or indirectly. This includes but is not limited to: employees, Subcontractors, suppliers and vendors. Prime Contractors shall also be responsible for any visitors they invite or allow to have access to the site, in line with site-specific requirements.

1.2 GENERAL

A. Prime Contractor will prepare a Prime Contractor's Site-Specific Safety Plan (SSSP) that encompasses all of its work scope and activities. This plan will incorporate any owner/site specific requirements.

1. Prime Contractor Site Specific Safety Plan (SSSP) shall include a Written Lead Compliance Program as required per Specification Section 02 83 13 – LEAD-HAZARD CONTROL ACTIVITIES.

B. The Prime Contractor must:
1. Submit and receive Owner's approval of the Prime Contractors SSSP prior to the start of work.
2. Update the SSSP as the work scope progresses, as conditions change or as other scopes or potential hazards are introduced.
3. Ensure flow down of all SSSP requirements to all subcontractor at each tier.

C. The Prime Contractor shall plan and execute all work while complying with:

1. All current applicable laws (including but not limited legally binding federal, state and /or local codes, standards, and regulations regarding environmental, safety and/or health matters) as they occur.

a. If applicable laws and/or provisions of these Safety Responsibilities and the SSSP differ, the more stringent requirement, as determined by the Owner, shall apply.

2. These Prime Contractor Safety Responsibilities / Terms and Conditions, processes and procedures, Owner Jobsite Safety process, the SSSP and all safety-related provisions of the Prime Contract.

3. Any special or additional requirements communicated by the Owner.

D. Prime Contractor is directly responsible for communicating to and ensuring adherence and accountability by all lower-tier contractors, subcontractors, suppliers, vendors, and their employees (including delivery drivers). To achieve this, the Prime Contractor will develop a defined "flow down" strategy and process to assure compliance, which shall include formal kick-off sessions with each tiered Prime Contractor, ongoing compliance monitoring and immediate response to deficiencies.

E. In accordance with the terms and conditions of the Contract, the Owner or its agent, reserves the right to take appropriate actions to remedy any non-compliance at the Prime Contractor's costs/expense. Owner also reserves the right to withhold payment pending correction and abatement of all noted or discussed hazards.

F. COVID-19 Site Specific Safety Procedures.

1. As information regarding the Coronivirus (COVID-19) evolves, Prime Contractor project managers shall continue to update their site-specific safety plan requirements based on health conditions, regional health organization guidelines, and government responses. Unless otherwise stated, these protocols apply to all Jamesville-DeWitt 2020 Capital Project Prime Contractors at all project locations.

i. Practice & encourage Good Personal Hygiene per the CDC guidelines:

a. Wash your hands frequently with soap and water for 20 seconds or utilize alcohol-based hand sanitizer with at least 60 percent alcohol. Be sure to wash your hands after coughing, sneezing or blowing your nose and avoid touching your eyes, nose and mouth. Wash hands or use sanitizer after removing work gloves.

b. Practice good coughing and sneezing etiquette. Cover your mouth and nose with a tissue when you cough or sneeze, or cough int elbow or shoulder.

c. Practice social distancing. Maintain a distance of at least 6 feet from others were possible. Avoid physical contact, like handshakes, hugs, etc. where possible. Limit/avoid areas where people congregate.

ii. Disinfect/clean your office or job site trailer regularly. Have disinfectant wipes/spray readily available. Pay special attention to the following areas:

a. Door Handles – Inside/Outside
b. Light Switches
c. Conference Tables, Desks/Furniture and Chair Arm Rests
d. Restroom – Dispensers, Flush Handles, Door Locks, Faucets & Handles
e. Kitchen/Break/Welfare Area Handles, Utensils, Wipe/Sanitize Countertops & Tables/Chairs
f. Appliance touchpads & Handles
g. Copy Machines and other Office Equipment
h. Mouse, Keyboard, Stapler, etc.

1.3 OPERATION / TRAINING / MEETINGS

A. All Prime Contractor employees, employees, and each subcontractor employee, will read and acknowledge that they understand the SSSP and this Prime Contractor Safety Responsibilities document prior to starting work.

B. Prime Contractor foremen, supervisors and superintendents assigned to the Owner's sites will be OSHA 30-hour certified or in pursuit thereof. All Prime Contractor personnel will be trained and/or certified in accordance with all federal, state, city and owner standards. Owner reserves the authority to require additional training of Prime Contractor or Subcontractors personnel as deemed necessary or appropriate.

C. In addition to the Owner orientation, the Prime Contractor or its Subcontractor shall provide an initial safety orientation to each new employee, including all sub-tier employees, prior to the start of work at the site. At a minimum, the orientation shall include training on general safety hazards, site-specific safety policies and procedures, personal protective equipment, fall protection, cranes and rigging, stored energy, injury reporting and protocols, emergency evacuation, and preferred medical providers. All orientations shall be documented by the Prime Contractor and verifiable by the Owner.

D. Prime Contractor shall provide for Toolbox safety meetings for all employees under it direct or indirect supervision. A copy of the Toolbox topics including sign-off sheets must be maintained and submitted to Owner.

E. Prime shall conduct periodic safety meetings with employees, foremen, and Subcontractors at all tiers to address safety, lessons learned and high-hazard activities.

1.4 INTENT OF DOCUMENTS

A. Plans and Specifications supplement each other and require the contractor to provide in their bid:
   1. All labor, material, tools, equipment, supervision, layout, delivery, shop drawings, submittals, appurtenances, transportation, related items, safety monitoring, etc., necessary to complete the work described in the trade contract summary of work for each Contract.
   2. All systems complete and left in good and/or specified operating condition.
   3. Any apparatus, appliance, material or work not shown on Drawings but mentioned in Specifications, or vice versa.
   4. Any accessories, reasonably inferable from Drawings and Specifications and as may be required by the manufacturer of such materials or equipment necessary to make the work complete.
   5. Any item, labeled in one location but not another, is typical, reasonably inferable from Drawings and Specifications and as may be required.

B. All sections of these Specifications as outlined in the trade contract summary of work shall apply in full to the contractor and their respective subcontractors. Notes or instructions shown on any one drawing apply to all other drawings.

C. Install all work in compliance with Plans and Specifications in excess of requirements of codes and regulations and not contrary to them.

D. The Contract Documents contemplate a finished piece of work of such character and quality as is reasonably inferable from them. The contractor shall provide full cooperation in coordinating the installation of its work with the work of others and to make its work complete and operational and in compliance with good practice. The contractor further acknowledges that inadvertent minor discrepancies or omissions or the failure to show details or to repeat on any part of the contract documents the figures or notes given on another shall not be the cause for additional charges or claims. In the event of such conflict between and among the parts of the Contract Documents, the more expensive way of doing the work, the better the quality or the greater the quantity of material shall govern unless the Construction Manager otherwise directs.

E. The Drawings are schematic in nature and are not intended to show every offset and detail. The Contractor shall make adequate provisions in their bid to accommodate the actual conditions without additional cost to the Owner.

F. Prime Contractor's employees, Subcontractor and all sub-tier employees shall participate in daily sunrise huddles and job-wide safety stand-downs as held by the Owner.

G. Prime Contractor and all Subcontractors management shall attend safety meetings as scheduled by the Owner.

1.5 MONITORING AND INSPECTION

A. Prime Contractor shall conduct daily visual inspections of all work areas and a formal and documented weekly safety inspection, notifying Subcontractor and Owner of any recognized hazards. A copy of the Owner weekly jobsite inspection form, or equivalent, will be provided to Owner within 24 hours.

B. Prime Contractor shall appoint and submit in writing to Owner the name of all "competent or qualified persons" (via OSHA standard) who are authorized and able to recognize and anticipate hazards. The qualifications of all these individuals shall be made available to Owner upon request. Such persons shall have authority to take prompt corrective action to abate hazards, including the authority to alter, modify or stop work in the process of hazard review or abatement.

C. Prime Contractor shall submit to Owner, and appropriately post, emergency contact information, including work, mobile telephone numbers and email addresses for all applicable operations and safety management personnel.

D. Prime Contractor will confirm and record headcount and hours worked each week by each tier Subcontractor and provide this report to the Owner at the end of each week. The report will contain a section to formally document any incident, near miss or injury.

E. Prime Contractor shall:
   1. Develop a Hazard Communications program that follows the OSHA Hazard Communications and Globally Harmonized System (GHS) standard;
   2. Ensure that all employees are trained to address potential chemical exposures/interfaces;
   3. Provide Owner with a copy of its written program (upon mobilization) and all SDS/MSDS's used in the performance of the Work.
   4. Maintain a copy of the program and library of SDS/MSDS used in the scope of work and also confirm program compliance by all tiered subcontractors.

F. Where applicable and in line with regulatory standards, Prime Contractor shall develop a respiratory protection program to include pulmonary baselines and fit testing per regulatory guidelines. A copy of the respiratory protection program will be provided to Owner prior to the start of work activity. All respirators will be used in accordance with OSHA standard, Prime Contractors program shall cover the requirements for Appendix D, Voluntary Respirator Use. The Prime Contractor will retain all signed copies of Appendix D used on the project, and provide copies to Owner on request.

1.6 INCIDENT PREVENTION, EMERGENCY PREPAREDNESS

A. Prime Contractors will ensure the development of a comprehensive severe weather plan to address extreme cold, heat and related conditions. Prime Contractor will also adhere to the Owner's program and any requirements established therein.

B. All Prime Contractor employees and Subcontractors at all tiers will be actively engaged in the Owner's Stop Work Authority (SWA) program. The Prime Contractor will highlight this program during kick-off, orientation and other employee forums. The Stop Work Program grants each employee the authority to pause or stop work to ask questions or to simply verify that conditions are safe. Employees that use the Stop Work Authority Program will not be retaliated against in any form.

C. Prime Contractor shall use the Owner's Task Hazard Analysis (THA) pre-planning process to address each separate work task/activity prior to the start of work on each shift. Prime Contractor will – with participation by subcontractors and employees − complete a THA form (or an Owner-approved alternative form) for each task. Each employee will start each shift having completed and engaged in at least one THA. Any changes in task or condition will warrant a new or modified THA. Prime Contractor will submit copies of each THA to Owner for review daily.

D. Prime Contractor shall provide adequate safety measures and controls to address potential occupational exposures such as gases, fumes, silica, dusts, chemicals, noise, and confined spaces. See the related Owner policies and standards. A specific plan to address silica is required prior to the start of work activity.

E. Prime Contractor shall provide Personal Protective Equipment (PPE) to all employees as required per Owner PPE requirements or regulatory requirements. Prime Contractor and all tiers shall take immediate corrective action for non-compliance up to and including removal toolbox

F. Prime Contractor will provide competent flaggers as needed for the safe access and egress of all heavy loads, trucks and equipment. Flaggers shall be trained in accordance with OSHA, DOT or other state or federal standards.

G. Prime Contractor shall implement immediate corrective action to eliminate unsafe practices and conditions as they are observed or reported. In cases where immediate or "On the Spot" actions are not taken, Owner reserves the option to abate the condition at the expense of the Prime Contractor, Subcontractor or both.

H. Prime Contractor shall comply with Specification Section 10 4400 – LEAD-SAFE WORK PRACTICES.

1.7 INCIDENT REPORTING AND RETURN TO WORK

A. Prime Contractor shall notify Owner within Two (2) hours of any incident involving injury/damage (or near miss of injury/damage) to any person or property. In addition, each Prime Contractor shall investigate such incidents, document findings in an incident report, and submit the report to the Owner, or Owner's Agent, within 24 hours of the incident. All incident reports must contain, but not be limited to:
   1. Date of Incident
   2. Chain of events leading to incident
   3. Witness Statements
   4. Impacted or injured parties (i.e., name, craft, position)
   5. Impacted property and estimated damage costs
   6. Immediate corrective measures taken
   7. Lessons learned for wider application by Prime Contractor or Owner
   8. Other items as requested by the Owner

B. The Owner, or Owner's Agent, will conduct formal incident review in response to any serious incidents. The Prime Contractor will participate and be represented by site and corporate management during any scheduled incident review sessions. Injured parties and witnesses to the incident may also be required to attend.

C. Prime Contractor shall implement an aggressive Return to Work and Modified Work policy and procedure. The procedure will include, but not be limited to:

   1. Identification of preferred local occupational medical provider.

   2. Prime Contractor approved work assignments and light duty work options for any and all injured parties who receive a physician's restricted-duty diagnosis. Owner reserves the right and authority to penalize Prime Contractor up to $1,500.00 per day for each day a fully released or restricted duty employee is not accommodated for modified work.

1.8 TOOLS AND EQUIPMENT

A. All equipment and tools shall be used per the manufacturer's recommendations and equipment with manufacturer-provided handles, safeguards and shields.

B. Prime Contractor will ensure the inspection of all hand tools and extension cords prior to their use and immediately remove any defective items from service.

C. Prime Contractor will ensure that no power tools have positive locking trigger. Each power tool shall be equipped with a constant pressure trigger.

D. Prime Contractor Prime Contractor shall ensure that all power tools and cords are protected by an operable Ground Fault Circuit Interrupter (GFCI) plugged in at the power source or GFCI circuit breaker or GFCI "pigtail." Above 110V, all cord sets and plug sets shall be protected via GFCI or Assured Equipment Grounding Conductor Program (AEGCP).

E. In addition to specific requirements established in OSHA §1926.304 and .304(f), Owner requires all Prime Contractor woodworking tools and machinery meet other applicable requirements of ANSI 01.1-1961. Section 3.1.3(c) of the ANSI standard. On applications where injury to the operator might result if motors were to restart after power failures, the Prime Contractor must incorporate an effective means of preventing the machine from automatically restarting upon restoration of power.

1.9 WORKING FROM HEIGHTS / FALL PROTECTION

A. Prime Contractor will utilize a 100% 6-foot fall protection policy and program. Each person on a walking or working surface with an unprotected side or edge that is 6 feet or more above the next lower level shall be protected from falls using the Hierarchy of Controls (elimination, substitution, engineering, administrative, and personal protective equipment). As such, personal fall arrest systems (PFAS) shall be considered as the last option. All personnel at all tiers will comply with this

requirement, including Roofers, Ironworkers, Erectors, and Connectors, regardless of any exemptions that might otherwise be available under OSHA, trade agreements or other applicable laws.

B. The following exceptions to the 100% 6-foot fall protection requirement may exist, depending on site-specific requirements:

1. Proper use of a step ladder (up to 12 feet) on a stable and level foundation.

2. Proper use of an approved and inspected extension ladder (up to 24 feet) for movement between levels (not as a working platform).

3. Step and extension ladders shall be positioned so as not to expose the employee to a secondary fall hazard (ex; window opening, stairway, etc.)

4. Other extraordinary circumstances only if (i) Prime Contractor's competent person determines that neither engineering controls nor a PFAS would be feasible; (ii) Owner provides prior approval in writing; and (iii) the method of proceeding complies with all applicable laws.

C. Equipment, such as scaffolding and ladders, shall be inspected for defects by Prime Contractor's competent person prior to use. Any equipment found to be defective or unserviceable will be immediately taken out of service and removed from site.

D. Job-made shall be built in accordance with ANSI A14.4 and OSHA standards and only after an alternate fall protection plan has been submitted and approved by the Owner or its Agent.

E. Prime Contractor shall ensure that any wooden or aluminum ladder used is approved through Owner ESH. These ladders are to be used only if all other approved methods have been deemed infeasible.

F. When operating/working in scissor lifts and from aerial work platforms, all Prime Contractor employees shall use personal fall restraint systems.

1. Prime Contractors will ensure any scissor lifts delivered on site are equipped with manufacturer approved anchor points, and employees must be tied off to those anchor points.

2. Standing on mid-rails and handrails is strictly prohibited and considered an imminent danger violation.

3. Blocks or steps are not permitted for stepping or to access a higher elevations.

1.10 CRANES AND RIGGING

A. When working with mobile cranes or tower cranes, Prime Contractor shall appoint a certified signal person and qualified rigger prior to any lift. Documentation on qualifications/certifications will be provided to the Owner. The Prime Contractor will adhere to all current and subsequent Owner crane and rigging policies and practices.

1.11 STORED ENERGY

A. All electrical tasks will be carried out in compliance with NFPA 70E, OSHA and Owners Stored Energy program. Additionally, Prime Contractor will only handle or engage de-energized wiring or circuits after appropriate Lock and Tag and a secondary confirmation of source isolation via a working voltage detector or similar instrument.

B. Prime Contractor shall ensure that all work on live electrical components is performed only when all other alternatives have been deemed infeasible. Any work on live/energized sources requires advance notice and written approval and consent by Owner's team (superintendent, ESH, senior management) and the owner (if required) – no exceptions.

C. Prime Contractor shall ensure that all permanent and temporary electrical deficiencies are locked and labeled with controlled access. All de-energized electrical and power systems will be locked out in accordance with appropriate lock and tagging guidelines.

D. Prime Contractor shall develop and submit a Pressure Testing Safety Plan to the Owner's agent prior to performing any pneumatic, hydrostatic or other pressure testing of pipes or vessels. Prime Contractor shall not use pneumatic testing as a testing medium unless required by the design and approved well in advance by the Owner and owner's agent.

E. Pressure Testing Policy and Procedures.

1. Definitions:
    a. Hydrostatic Testing – The utilization of a fluid (typically water) as the medium for testing pressure.
    b. Pneumatic Testing – The utilization of a gas (typically air or nitrogen) as the medium for testing pressure.
2. Pressure Test Permit: Planning & Approval
    a. Develop a pressure test safety plan.
        i. Hydrostatic pressure testing reviewed by EHS.
        ii. Pneumatic pressure testing reviewed and signed by the Construction Manager.
    b. Identify the prime contractors' competent person(s)
    c. Submit verification of training for all employees involved in the testing procedures.
    d. Establish the proper exclusion zones and mark a print showing along with barricading.
        i. Adequate hydrostatic pressure testing exclusion zones must be established; determined by the project team.
        ii. Pneumatic pressure testing exclusion zones must be a minimum of 100 feet or what is agreed by the Construction Manager.
    e. Utilize cinch sacks on all caps or pipe ends that could potentially be worked on, removed, or could expose employees to sudden release of stored energy.
    f. Pressure testing areas must be clearly identified with "Danger – Under Pressure" tags or signs.
    g. Identify all relief mechanisms to be used in the de-pressurization process. This is best shown on the print outlining the piping and barricading area.
    h. Notify all site personnel of the upcoming test, at a minimum **24 – 48 hours in advance**.
    i. Performing the test during off hours, weekends, or when there are limited personnel in the test area is highly preferred.

3. Lockout / Tagout Procedures

a. This procedure establishes the minimum requirements for lock out and tag out of energy isolating devices. It shall be used to ensure that all authorized and affected employees working on or near energized equipment are protected from potentially hazardous release of any stored energy.

b. In addition to this procedure, prime contractors and subcontractors who maintain or service equipment where the unexpected start-up may cause injuries shall develop and use a written Lockout/Tagout program that complies with OSHA 29 CFR 1910.147.

c. Authorization / Responsibility

i. Only authorized and trained personnel in "Lock Out Tag Out" procedures will be allowed to perform lock out tag out.

ii. It shall be the responsibility of the Prime Contractor to ensure proof of training has been received and validate for all personnel performing Lock Out Tag Out. Such proof of training will be delivered to the Construction Manager and maintained on site.

d. RULES

i. Locks, chains, wedges or other hardware which meets the requirements defined in 190.147 © (5) (ii) shall be provided by the prime contractor who is to apply such device.

ii. Locks for lockout devices shall be singularly identified and have only one key. They shall be the only devices used for controlling energy and shall not be used for other purposes.

iii. The lockout device shall indicate the identity of the employee applying the devices.

iv. All stored energy, machines and or equipment shall be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Lockout will also apply when working on or near deenergized store energy.

v. No worker shall attempt to operate any switch, valve, or other energy – isolating device which is locked out.

vi. Each lockout device shall only be removed by the employee who applied the device.

vii. No locked-out system will be energized without the knowledge and approval of the Construction Manager. This is to ensure that such system is ready for energization in accordance with the project schedule and start up requirements.

e. Preparation for Shutdown

i. No system shall be energized, de-energized or connected to an existing system without a pre-planning session with consisting at a minimum of the Construction Management Team (Project Manager and/or Superintendent), controlling prime contractor for the installed system and any prime contractors who could be inadvertently affected by such system being energized, de-energized or connected to an existing system. The owner and their representative will be in attendance of such pre-planning as required.

ii. In preparation for lockout, an initial survey must be made to locate and identify all energy isolating devices to be certain which switch, valve, or other energy isolating devices applied to the stored energy, equipment or machine to be locked out. More than one energy source (electrical, hydraulic, pneumatic, chemical, thermal, or others) may be involved.

iii. Before an authorized or affected worker turns off any system, equipment or machine, the authorized worker must have knowledge of the type and magnitude of the energy to be controlled, and methods to the energy.

iv. A Task Hazard Analysis (THA) shall be completed and appropriate permit obtained prior to work or execution on all energized sources and prior to lock-out/tag-out.

v. The Construction Manager for the project shall have a lock and tag on the System(s) to prevent accidentally release of energy at the point of main energy source. Any potential secondary energy points whereas the system may be energized will also be locked out by the Construction Manager.

f. Machine or Equipment Shutdown

i. All affected workers shall be notified that a lockout system is to be utilized and the reason for it, before the controls are applied.

ii. If machine or equipment is operating shut it down by normal stopping procedures.

g. Machine or Equipment Isolation

i. Physically located and operate the switch, valve, or other energy isolating devices so that the equipment is isolated from its energy sources and apply adequate hardware.

h. Stored Energy

i. All stored or residual energy in pneumatic, hydrostatic, hydraulic, mechanical systems, etc. shall be blocked or dissipated. If there is a possibility of reaccumulating of stored energy, verification of isolation must be continued until testing, servicing, or maintenance is complete.

i. Electrical Panels

i. During new construction or renovations, feeder lines shall not be connected to any operable panels until all work on the circuit is completed.

ii. All electrical panels shall be controlled and accessed solely by qualified Electricians or in an emergency, a competent Construction Manager representative.

iii. When energized, all electrical panels will be clearly labeled with appropriate warning signage. The signage will be clear and visible for all workers and the owner's staff.

iv. All breakers in all electrical panels shall be clearly and legibly marked and identified.

v. All temporary electrical panels will have covers and a locking option.

vi. The Lock out/Tag out process will be carefully implemented and monitored for all work on energized circuits. Additionally, the company and all subcontractors will follow and comply with all provisions of OSHA Standard 1926.417.

vii. All equipment, panels and circuits that are de-energized must be rendered inoperative and include a physical lock and tag. This directive also applies to each breaker in each temporary or permanent electrical panels. This applies to all voltages, including 110.

viii. The Electrical Contractor shall provide the Construction Manager a list of competent persons who are responsible for the implementation of OSHA Subpart K 1926.400.

j. Lockout Device Application

i. Authorized workers shall lockout the energy isolating devices with assigned individual locks.

ii. Lockout devices shall be applied so that they will hold the energy isolating devices in a "Neutral" or "off" position.

k. Verification of Isolation

i. Prior to starting work on any stored energy system, equipment or machinery that has been locked and after ensuring that no personnel are exposed, the authorized worker shall confirm the absence of energy using a secondary means of verification, i.e. voltmeters, checking pressure gauges, proper testing equipment, or engaging start buttons, prior to working on potentially energized systems.

l. Removal of Lockout Devices

i. After the testing, servicing or maintenance is completed and before the lockout devices are removed and energy is restored, the following sequence of activities shall be completed by the authorized worker(s).

ii. If the authorized worker who applied the lock is not available, the supervisor shall take the following steps:

a. Attempts to contact the individual must be taken. It is best if the individual can return to remove his/her own lock before proceeding with this process.

b. Document each step on a specific THA for the lock removal process.

c. Clear the stored energy system, equipment or machinery of tools and materials.

d. Remove workers & staff from the stored energy, equipment or machinery areas.

e. Remove the lockout device.

f. Energize and proceed with testing or positioning.

g. Deenergize all systems and reapply energy control measures in accordance with "Lockout Procedures and Techniques".

1.12 VIOLATIONS, DISCIPLINARY ACTION

A. Prime Contractor and all tiered subcontractors shall adhere to and enforce all requirements established by Owner or Agent's Safety Disciplinary Actions and Imminent Dangers procedure.

1. At the discretion of Owner management, serious or imminent danger violations will warrant immediate action, up to and including termination and/or removal from the project.

2. Any supervisor or manager who knowingly exposes employees to imminent danger situations is subject to immediate termination.

B. Imminent danger situations include, but are not limited to, the following:
1. Violation of Stored Energy Program and Lockout/Tagout Procedure, including removing another lockout sign or tag without authorization and working on equipment or circuits that could be accidentally or unintentionally energized. In all cases, failure to develop, submit or follow a pipe/vessel pressure test plan will be considered an imminent danger violation and grounds for termination or removal from site.
2. Violation of the 100% 6-Foot Fall Protection and Prevention Policy, including standing on top of first rung of a step ladder of any height.
3. Violation of the Cranes and Rigging Policy, including operating a crane (lifting, swinging or loading) adjacent to energized power lines less than 20 feet away and using rigging equipment in excess of the recommended safe workload capacity.
4. Violation of the Confined Space Procedure, including unauthorized entry to a confined space.
5. Violation of the Excavation/Trenching Procedure, including working in or authorizing work in unsloped, unshored or unprotected trenches or excavations.
6. Violation of the mobile equipment procedures including operating mobile equipment (ex. Fork lifts and skid steers) without appropriate certification, training, authorization or inspection.
7. Violation of procedures related to caught-in/struck-by hazards, including entering the line of fire (i.e. walking under a suspended load.
8. Violation of the Drug and Alcohol Policy, including distribution or working under the influence of mind-altering substances.
9. Accessing exclusion zones/red barricaded areas without authorization.
10. Conscious disregard of a 'DO NOT OPERATE", "DANGER" or "WARNING" sign.
11. Intentionally removing a guard or safety mechanism designed for employee safety.

C. Additional items that warrant immediate removal or termination include: fighting and verbal abuse, exhibiting open disregard for Owner safety or project safety programs, theft, sabotage, firearms, smoking in non-designated areas, falsifying a company document (i.e. accident investigation, testimony, equipment inspection, certifications, etc.)

D. If Owner or its agent determines safety performance standards are not being met, Prime Contractor may be required to designate a full-time, on site, dedicated safety professional. This determination may be based upon: on site injury/illness rates;

safety violations/concerns issued by Owner or a regulatory authority; or lack of participation in required safety forums, activities and meetings. Any designated safety professional shall meet the qualification requirements as defined by Owner.

1.13 WORKSITE RULES

A. The Owner and its Agents, reserves the right to remove a party, employee, or contractor from the site at any time and for any reason.

B. The following work rules are important to the safety of all personnel on Owner sites and shall be adhered to at all times.
1. Possession of or working under the influence of alcohol or drugs is prohibited and subject to immediate dismissal.
2. Hazard Communication and Lockout/Tag-out Programs shall be observed.
3. Unsafe conditions or acts, along with any accidents or near misses shall be reported to your immediate supervisor and am member of the Owner's management team.
4. Appropriate Personal Protective Equipment shall be worn at all times. Minimum requirements in construction areas are hard hats, safety glasses, high-visibility vests/shirts/jackets and durable boots covering the feet and ankle. **Appropriate work gloves are required for all employees at all times while on site.**
5. Modifying or altering any piece of personal protective equipment is strictly prohibited.
6. All Prime Contractor delivery drivers, vendors, trucking or concrete drivers will adhere to all site PPE requirements.
7. Work wear shall not be offensive or inappropriate.
8. Maintaining good housekeeping is mandatory at all times. Prime contractor is responsible for ensuring daily clean up.
9. "Horseplay", harassment, fighting, workplace violence, and other inappropriate behaviors are strictly prohibited.
10. Taking photos, picture or video is limited to verifying the proper execution of work. Only authorized members of management shall take photos, pictures, or video of incidents and accidents that occur.
11. Tampering with fire protection, firefighting or life safety equipment, or removing it from its assigned location, is prohibited and grounds for immediate termination/removal.
12. Only authorized, licensed and properly instructed site employees shall operate machinery, equipment, vehicles, and tools. This includes but is not limited to cranes, forklifts, lulls, skid steers, front-end loaders, flatbed trucks, nail guns, and drill presses.
13. Vehicles are to be operated and driven in a safe manner at all times.
14. Firearms are prohibited on site or in parking lots at all times.
15. No one should enter barricaded areas without proper authorization.
16. Adhere to "No Smoking" rules. Smoking and the use of tobacco products are prohibited by New York State law on all School grounds.
17. All gasoline engines shall be shut off and allowed to cool prior to refueling.
18. The use of plastic gas cans for storing combustible/flammable liquids on the site is prohibited. Use only approved metal containers.
19. The use of FM/AM radios, iPods and MP3 players on site is prohibited at all times.
20. Cell phones are strictly prohibited while performing trade / craft work. Bluetooth headsets are prohibited unless used in the execution of a specific task or job.

END OF SECTION 01 16 40

SECTION 01 10 00
GENERAL SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Division 0 and Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The work of this Project is separated into five (5) Prime Contracts, four (4) Procurement Contracts and one (1) Procurement Contract for Equipment.

B. The Prime Contracts for this project are listed as follows:

1. 01 10 10 GENERAL CONSTRUCTION (GC)
2. 01 10 20 PLUMBING (PC)
3. 01 10 30 HVAC (HVAC / MC)
4. 01 10 40 ELECTRICAL (EC)
5. 01 10 50 SITE WORK (SC)

C. Cooperative Purchase Contracts:
1. 01 10 60 - ROOFING CONTRACT (RC)
2. 01 10 70 - PLAYGROUND INSTALLATION
    a. Equipment furnished by Owner.
3. 01 10 90 - PRESSBOX

D. Procurement Contract for Equipment:
1. 01 10 80 - TEMPERATURE CONTROLS EQUIPMENT & PROGRAMMING

E. The work described within this Bid Package takes place at the following locations:

Homer Senior High School
80 South West Road
Homer, NY 13077

Homer Intermediate / Jr. High School
58 Clinton Street
Homer, NY 13077

Homer Elementary School
9 Central Park Place
Homer, NY 13077

Press Box
80 South West Road
Homer, NY 13077

Bus Garage / Admin Building
80 South West Road
Homer, NY 13077

1.3 WORK UNDER SEPARATE CONTRACTS

A. One set of documents is issued covering all multiple Prime Contracts. Each Prime Contractor is to review all drawings and specifications for complete understanding and knowledge of the work.

B. Prime Contracts, in the context used in this Section, are separate contracts that represent significant elements of work that are performed concurrently with and in close coordination with work performed on the project under other prime contracts with the Owner.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

1.4 INTENT OF DOCUMENTS

A. Plans and Specifications supplement each other and require the contractor to provide in their bid:

1. All labor, material, tools, equipment, supervision, layout, delivery, shop drawings, submittals, appurtenances, transportation, related items, safety monitoring, etc., necessary to complete the work described in the trade contract summary of work for each Contract.
2. All systems complete and left in good and/or specified operating condition.
3. Any apparatus, appliance, material or work not shown on Drawings but mentioned in Specifications, or visa versa.
4. Any accessories, reasonably inferable from Drawings and Specifications and as may be required by the manufacturer of such materials or equipment necessary to make the work complete.
5. Any item, labeled in one location but not another, is typical, reasonably inferable from Drawings and specifications and as may be required.

B. All sections of these Specifications as outlined in the trade contract summary of work shall apply in full to the contractor and their respective subcontractors.

C. Notes or instructions shown on any one Drawing apply where applicable, to all other Drawings.

D. Install all work in compliance with Plans and Specifications in excess of requirements of codes and regulations and not contrary to it.

E. The Contract Documents contemplate a finished piece of work of such character and quality as is reasonably inferable from them. The contractor shall provide full cooperation in coordinating the installation of its work with the work of others and to make its work complete and operational and in compliance with good practice. The contractor further acknowledges that inadvertent minor discrepancies or omissions or the failure to show details or to repeat on any part of the contract documents the figures or notes given on another shall not be the cause for additional charges or claims. In the event of such conflict between and among the parts of the Contract Documents, the more expensive way of doing the work, the better the quality or the greater the quantity of material shall govern unless the Construction Manager otherwise directs.

F. The Drawings are schematic in nature and are not intended to show every offset and detail. The Contractor shall make adequate provisions in their bid to accommodate the actual conditions without additional cost to the Owner.

1.5 GENERAL REQUIREMENTS

A. All Prime Contractors are responsible for all work under their contract no matter what drawing on which that work appears, including drawings of other trade disciplines. For example, the HVAC Contractor will be responsible for HVAC work shown on Architectural, Plumbing, and Electrical Drawings etc.

B. All Trade Contractors are responsible to provide complete all Permits and Inspections, including any associated fees, that may be required by any local and state code agency relative to the work of their contract.

C. All work must conform to any applicable codes including but not limited to OSHA, Federal, State, Local, Governmental Agencies having jurisdiction and / or Owner requirements.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

D. Contractor shall comply with all applicable federal, state, county and municipal laws concerning pollution of surrounding public waters. All work shall be performed in such a manner that objectionable conditions will not be created in public waters through or adjacent to the project areas.

E. Local custom and trade union jurisdictional settlements do not control the scope of work included in each prime contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected prime contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays. Prime Contractors affected by such disputes shall be responsible for any related schedule and / or cost impact.

F. Union business shall not be conducted on site. Any Union Representative that visits the site must declare what Contractor's personnel they represent and must be escorted by that Contractor's Union Steward at all times. No visitors, sales representative or non-working personnel shall be permitted onsite without prior consent of the Construction Manager. No photographs shall be taken without the Construction Manager's prior approval.

G. Indoor Air Quality as a result of construction activity must be controlled. The transmission, movement or infiltration of construction dust, odors, vapors and/or other particulates is prohibited. Each Contractor is responsible for this and must take appropriate measures to control all dust, odors, vapors and/or other particulates through the use of fans, negative air machines and/or off shift work. Any degradation of IAQ in spaces will necessitate the shutdown of such operations until the IAQ in the spaces can be rectified. Failure to control the IAQ due to construction activities shall require the completion of the work during off hours.

1. Construction operations such as demolition, sanding, painting, the use of mastics, and other construction operations, that may produce an odor or a dust condition, shall be scheduled with the Construction Manager 72 hours in advance of when such operation might occur. The Construction Manager and the Owner will review the request to proceed with said construction operation and decide if the operation can be done at that time, have to be rescheduled, or if additional precautions need to be implemented by the Contractor to carry out the operation that may produce an odor or a dust condition. Any rescheduling or additional precautions required by the Construction Manager or the Owner shall be carried out by the Contractor at no additional cost to the project.

H. Decisions required from the Construction Manager, Architect and/or Engineer shall be anticipated by the Contractor to provide ample time for inspection, investigation or detailed drawings. A “Request for Information” form will be provided by the Construction Manager to the contractor. This form is to be filled out completely by the Contractor and entered electronically into Procore and sent to the Construction Manager for further processing. Verbal request for information will not be acted upon. Any verbal responses are not binding.

I. Repair for any damage to existing or new structure, finishes, ceilings, walls, flooring, equipment, fixtures etc. caused by defective or ill-timed work shall be borne by the responsible Contractor.

J. Provide complete all surface preparation, prime and seal substrates in accordance with the Manufacturer’s recommendations for the type of substrate involved. Apply sizing to all gypsum drywall prior to installation of wall covering. Each Contractor shall verify compatibility of substrates as supplied by others. Starting of work shall constitute acceptance of substrates. Do not proceed with surface preparation or painting application until conditions are suitable.

K. The Construction Manager is responsible for assigning the work to the various Prime Contracts. The “Summary of Work” sections prepared for each Prime Contractor by the Construction Manager take precedence over the Architect’s drawings and specifications.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

L. Each Contractor is responsible for providing material to the jobsite in a manner consistent with the Milestone Construction Schedule and Phasing Plans.

M. Equipment furnished by all Contractors shall be factory painted and field protected until acceptance by the Owner. If proper protection has not been provided or maintained, the material will be refinished, repaired, or replaced at the discretion of the Construction Manager at no cost to the Owner.

N. Contractor's personnel will not be permitted to use Owner's Food Service Facilities.

1.6 WORK SEQUENCE

A. The Work will be conducted to provide the least possible interference to the activities of the Owner's operation.

B. Work is to be performed weekdays (Monday through Friday) from 7:00 AM to 3:30 PM unless otherwise noted. Work cannot be performed in occupied spaces and shall be scheduled during off-hours, vacations and weekends for occupied spaces as coordinated and approved with the Construction Manager/Owner. A Construction Manager representative and Prime Contractor Supervision shall be on site at all times that work is being performed. If a Contractor fails to maintain the progress as indicated by the milestone schedule by no other fault but its own and requires overtime to complete the work; the Contractor shall make arrangements with the Construction Manager 24 hours in advance and pay for a Construction Manager's superintendent and an Owner's representative on an overtime rate. In the event that the cause for delay is multi-contract, then the costs shall be distributed proportionately across affected Contracts.

C. The intention of the work is to follow a logical sequence; however, the Contractor may be required by Construction Manager to temporarily omit or leave out any section of his work or perform his work out of sequence. All such out of sequence work and returning to these areas shall be at no additional cost to the Owner.

D. Coordination of any utility and/or power interruption must be done with the Construction Manager and shall be scheduled 72 hours in advance. Shutdowns must occur during off hours and non-occupied days only. Each Contractor shall provide complete all terminations, removals and tie-ins as required by their Contract. Include all necessary premium time or shift work as required. Shift work must be approved in advance by the Construction Manager.

E. Any and all shut downs are to be coordinated with the Construction Manager and Owner and shall be scheduled 72 hours in advance of any proposed shut down. Obtain permits and pay all fees associated with required shut downs, disconnections, or relocations. All existing life safety type systems are to remain operational during installation of new system. All temporary work required to keep existing systems operational is the responsibility of the Contractor installing the work.

F. Any Prime Contractors who install their work out of sequence according to the Milestone Schedule shall protect their work from fireproofing overspray. No work shall be performed that prohibits fireproofing from being properly installed.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

1.7 MANPOWER / SUPERVISION

A. Contractor understands that time is of the essence and will adequately man the job to successfully complete the Contract Work in accordance with the Construction Manager's Milestone Schedule. The option to work extended hours and weekends at the Contractor's expense under prior agreement with the Construction Manager may be made available to meet this schedule at no additional cost to the Owner.

B. The Construction Manager shall have the authority to direct the contractors and subcontractors to work overtime including weekends to maintain the schedule at no additional cost to the Owner. Contractors warrant that the work shall be physically complete, including punch list, startup and commissioning, within the early start and late finish schedule milestones.

C. Each Prime Contractor shall provide multiple crews to maintain the project schedule. Each crew is to be furnished with its own supervision, cranes, scaffold and other means necessary to maintain the Project Schedule.

D. The General Construction, HVAC and Electrical Contractor shall provide full time, non-working, onsite supervision from project commencement until such time as determined by the Construction Manager. This is to include supervision for all Subcontractors. If supervision is reduced or terminated without the consent of the Construction Manager, the Construction Manager will appoint an individual to manage work under this Contract with all cost borne by the Contractor, and continues to assume all responsibilities for the appointed individual and the work of this Contract. The contractor’s on site superintendent shall be on a Full Time basis in a managerial capacity to continuously expedite, direct, supervise and coordinate the work and shall not engage in performing actual work. A working Forman shall not be designated by the contractor as a superintendent.

    1. All other Contractors are required to provide a working Supervisor for the duration of the project. This working Supervisor will be required to perform all duties of an on site Supervisor per the Contract including but not limited to: responsible for safety, attend meetings, coordinate and expedite the work and work of subcontractors.

E. The proposed Contractors’ Project Manager and Field Superintendent for the project are to have sufficient experience and be successful in the proposed position. Each successful bidder shall submit resumes to the Construction Manager for the proposed Project Manager and Field Superintendent for the project. This information will be reviewed with the Owner, Architect and Construction Manager for approval. Should the Project Manager and/or Superintendent prove unqualified for the position at any point in the project, the Construction Manager shall issue a letter stating that the person is to be removed from involvement in the project. Contractor shall replace with a qualified individual promptly. Such full time Field Superintendent shall be required on site until such time as all Contract Work, including punch list work, is completed, and accepted.

F. Each Contractor shall employ the appropriate trades people for their work as required. These people shall be experienced in their trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing each project.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

1.8 SITE LOGISTICS / ACCESS

A. Each Contractor shall limit their operations, including storage of materials and prefabrication to areas designated by the Construction Manager. Contractor shall move at their own expense any stored products under Contractor's control, including excavated material, which interfere with operations of the Owner or other Contractors.

B. The Construction Manager will determine when a construction operation can be carried out in Owner occupied areas. The Construction Manager's decision of when the work can take place shall not constitute that the Contractor is entitled to additional compensation.

C. All Contractors shall try to minimize their presence in areas that are occupied by the Owner. Construction work in these areas will generally be performed when the public is not present.

D. The Construction Manager shall indicate to the Contractors entry points to the construction areas and routes through Owner occupied areas. The Contractor will ensure that their employees use only these entry points and routes through Owner occupied areas. A specific stairwell should be assigned for construction worker use during work hours. In general, workers may not use corridors or stairs designated for the Owner.

E. There will be no contact between the Contractor or their personnel and the Owner. The Contractor is not to take direction from anyone but the Construction Manager.

F. No visitors, sales representative or non-working personnel shall be permitted onsite without prior consent of the Construction Manager. Visitors are to sign in at the Construction Manager's field office prior to entering the site.

G. All Contractors must plan, provide and maintain their own access, ramping, and egress as required into and out of the site, staging of trailers, materials machinery, and equipment in agreement with the Construction Manager's Superintendent. Each Contractor shall provide complete all planking and protection for walks, pavements, and curbs, etc. which are to be crossed by equipment. Trucking and delivery operation should be coordinated with Construction Manager's Superintendent and all other trades.

H. During excavation and backfill operations that interfere with other Prime Contractors means of access and egress to the site, the Prime Contractor performing the work must provide an alternate means of access and egress. Any damage to finished grades shall be repaired by the Contractor responsible for the damage.

1.9 COORDINATION

A. Each Prime Contractor shall coordinate scheduling and installation of work with the work of other Contractors, sub-contractors and other trades. Each Contractor is also required to coordinate all work of their Contract with Owner-supplied materials, direct contacts and normal building operations.

B. Each Prime Contractor shall supply and coordinate exact locations of embedded items in concrete or masonry work with the General Construction Contractor. Each Prime Contractor shall monitor such items throughout concrete/masonry activities to ensure proper placement.

C. HVAC, Electrical and Plumbing Prime Contractors shall be responsible for providing any rough opening or masonry opening dimensions to the General Construction Contractor. HVAC, Electrical and Plumbing Prime Contractors shall be responsible for any rework or

additional work required due to their failure to provide this information prior to the schedule start of wall construction.

D. The HVAC, Electrical and Plumbing Prime Contractors shall coordinate all device and rough-in locations required with the casework shop drawings.

E. Each Contractor shall take special care in verifying that his equipment matches the characteristic of the power being supplied. All Contractors shall coordinate with the Electrical Contractor and provide them with a copy of the approved submittal for all equipment that require electrical power.

1.10 TEMPORARY FACILITIES

A. Refer to Specification Section 01 51 00 for detailed information related to Temporary Facilities.

1.11 SURVEY & LAYOUT

A. All Prime Contractors shall work from the Benchmark identified in the Contract Documents and verified by a licensed surveyor employed by the General Construction Contractor.

1. The General Construction Contractor shall furnish and erect all necessary batter boards, establish all lines and levels and connection therewith, and run all subsequent lines and levels as the work progresses in order to assure careful and accurate work true to the proper lines in accordance with the Contract Documents. Any batter boards, monuments, or marks of reference, which may for any reason become disturbed or destroyed, whether such displacement or destruction is caused by carelessness, accident, or by the elements, shall at all times, be promptly and accurately re-established by the Contractor.
2. The General Construction Contractor shall establish finished floor elevations and finished grade lines for the building for all trades when requested to do so; and shall establish center lines of all interior partitions on floor forms before concrete is placed in order that HVAC, Electrical and Plumbing Contractors will be able to place sleeves, etc., in proper locations.

B. Each Contractor is responsible for layout and elevations for all their work and is required to transfer all lines and grades to correctly perform all their work.

1. Each contractor shall establish exact position of their work from reference points as shown on the Contract Drawings and shall additionally be responsible to coordinate and check with other contractors' work that is connected with their work before proceeding.
2. Any error, apparent discrepancy or absence in or of data shown or required for accurately accomplishing work layout by the contractor, shall be referred to the Construction Manager for interpretation of furnishing when such is observed or required.
3. Survey crewmen and grade foreman of the Contractor shall be knowledgeable and experienced in construction layout acceptable to the Construction Manager and Architect.
4. Contractors shall be responsible for the accuracy of the work and shall construct all improvements in the proper locations as shown on the Contract Drawings, or as modified by Change Order, Field Work Directive.
5. Contractors shall keep record of all layout and calculations and shall make copies of such records available to the Construction Manager and Architect at any time.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

C. The General Construction Contractor shall provide services of a licensed surveyor for building layout, elevation, and as-built foundation location.

1.12 CUTTING AND PATCHING

A. Refer to Specification Section 01 73 10 for detailed information related to Cutting and Patching.

B. Roofing Contractor is responsible to cut the existing and new roof areas for the HVAC, Plumbing and Electrical contractors for their respective penetrations and ensure the roof is watertight at all times. Each contractor shall lay out their penetrations and coordinate with the Roofing Contractor to cut and patch in a manner to maintain existing roofing manufacturer's warranty.

1.13 CLEAN UP REQUIREMENTS

A. Refer to Specification Section 01 74 00 for detailed information related to Clean Up Requirements.

B. All Contractors are responsible for daily cleanup of all debris caused by their work. A weekly joint clean up and disposal is required by each Contractor for the periods which that Contractor is performing work on site, on a day selected by the Construction Manager. Each trade (Contractor and Subcontractor) will assign at least one person to the weekly clean up; the name of this person is to be submitted to the Construction Manager. Contractors will provide sufficient cleanup personnel and sweeping compound as directed by the Construction Manager. Any Contractor not providing personnel will be charged for labor provided by the Owner.

1.14 TESTING & LABORATORY SERVICES

A. Refer to Specification Section 01 45 30 for detailed information related to Testing Laboratory Services.

1.15 PRIME CONTRACTOR RESPONSIBILTIES

A. Each prime contractor shall be responsible for de-watering all excavations pertaining to their scope of work for the duration that the excavations must remain open and to maintain the project schedule.

B. Unless specifically indicated in the Contract Documents that a ceiling system is being removed, re-installed or replaced by others, each Prime Contractor shall be responsible for the removal and re-installation of all existing ceilings systems where they have work to be installed above the ceiling. Any damage to these existing ceiling systems due to the removal and re-installation process shall be that Contractor's responsibility to repair or replace the ceiling as directed by the Construction Manager at no additional cost to the Owner.

C. Each Prime Contractor is to survey existing work and submit to the Construction Manager a list of damaged areas (i.e. ceiling tiles, concrete side walks… etc.) prior to commencing work. Any damaged areas not identified prior to the work shall be the responsibility of the contractor(s) working in that area.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

D. Each Prime Contractor is to provide sufficient protection of their work throughout the construction period by use of Kraft paper, plastic, plywood, or other means acceptable to Construction Manager.

E. Each Prime Contractor is responsible for locating (via Instrument) all existing below-grade utilities; including but not limited to telephone, cable, data, water, sewer, gas, storm drains, etc. prior to any excavation work.

F. Each Prime Contractor is responsible for their own excavation and backfill as required for installation of their work.

G. The Site Work Contractor is responsible for all site utilities to within 5' outside the building perimeter wall. Final connections of plumbing related utilities are by the Plumbing Contractor. The Site Work Contractor and Plumbing Contractor are to coordinate elevations of all utilities.

H. The Site Work Contractor shall be responsible for proof rolling the building pads and parking lots so that the Testing Agency can be scheduled to inspect and approve sub-grade.

I. The Site Work Contractor shall review and accept the subgrade prior to the start of foundations.

J. The General Construction Contractor shall send a letter to the Construction Manager to confirm that the structural steel is ready for installation following the concrete work and is in compliance with the following:

1. The concrete in the footings, piers and walls and the mortar in the masonry piers has attained on the basis of an appropriate ASTM standard test method of field cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.
2. Attach copies of all test results and anchor bolt modification notice from the Design Engineer where applicable.

K. Each HVAC, Electrical and Plumbing Prime Contractor shall be responsible for all interior and exterior mechanical / housekeeping pads required for their equipment.

L. Roof penetration work is defined as follows:

1. Within 45 days of Notice to Proceed the HVAC, Plumbing and Electrical Contractor shall provide the General Construction Contractor a complete list (quantity, size, location and coordinated sketch or drawing) of structural support required for all roof penetrations per Contract Documents.
2. Roofing Contractor is responsible for cutting & patching of roofing materials.
3. All blocking, flashing and installation is by the Roofing Contractor.
4. Support framing for roof penetrations and equipment suspended from steel structure is provided by the General Construction Contractor. Coordinate work with Prime Contractor requiring such support.
5. Cutting and patching of roof decks is by the Prime Contractor requiring the penetration.
6. Roof curbs are furnished and laid out by the HVAC Contractor and then installed, flashed in and tied into the roofing system by the Roofing Contractor.
7. Roofing Contractor shall provide all required boot, pitch pocket, flashing materials for making roofing penetrations by other trades watertight. Layout of roof penetrations shall be performed by the Prime Contractor requiring the penetration.

SECTION 01 10 00
GENERAL SUMMARY OF WORK

8. Each Contractor shall provide all temporary weather protection and safety coverings associated with the equipment openings required under their scope of work.

M. Through Wall Penetrations at new wall construction are defined as follows:

1. Within 45 days of Notice to Proceed the HVAC, Plumbing and Electrical Contractor shall provide the General Construction Contractor a complete list (quantity, size, location) of loose lintels required for all through-wall penetrations per Contract Documents.
2. The General Construction Contractor shall furnish and install all lintels at new wall construction.
3. All piping, ductwork and conduit penetrations through new fire rated construction shall be sealed fire safe by a UL listed approved method by the Prime Contractor requiring the penetration. All piping, ductwork and conduit penetrations in new construction partitions shall be sleeved. These sleeves shall be furnished by the Trade responsible for the penetration and delivered to the General Construction Contractor for installation at new wall construction.

N. Through wall penetrations at existing wall locations are defined as follows:

1. Each HVAC, Electrical and Plumbing Prime Contractor shall provide cored penetrations patching, UL listed fire sealant smoke sealant at existing wall locations associated with openings required under their scope of work.
2. All pipe and conduit penetrations through existing rated construction shall be sealed fire safe by a UL listed approved method by the Prime Contractor requiring the penetration. All piping, ductwork and conduit penetrations in existing walls partitions shall be cored and sleeved. These sleeves shall be furnished and installed by the Trade responsible for the penetration.
3. All duct penetrations through existing rated construction shall be sealed fire safe by a UL listed approved method by the HVAC Contractor. HVAC Contractor shall provide layout at the location of the duct penetration. The General Construction Contractor shall cut the opening, lintel and patching for the duct penetration layout provided by the HVAC Contractor.

O. All fireproofing application will be installed prior to HVAC, Electrical and Plumbing work, with the exception of support hangers, being installed in accordance with the project milestone schedule. Should the General Construction Contractor fail to complete this work in accordance with the project milestone schedule, it will be this Contractor's responsibility to protect previously installed work.

1.16 PROCORE / NEWFORMA REQUIREMENTS

A. Each Contractor shall provide its management personnel assigned to this Project with access to personal computers or tablets and the Internet on a daily basis.
B. Each Contractor shall conduct Project controls, outlined by the Construction Manager, utilizing a designated web-based application. Access to this designated web-based application will be provided by Construction Manager.
C. Each Contractor shall visit Procore on a daily basis, and as necessary to be kept fully appraised of Project developments, for correspondence, assigned tasks and other matters that transpire on the site. These may include but are not limited to: RFI's, action items, meeting minutes, observations, revisions to contract drawings and or specifications, submittals, punch list items, and daily reports.

END OF SECTION

SECTION 01 10 10 GC
SUMMARY OF WORK – GENERAL CONSTRUCTION CONTRACT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including the General and Supplementary General Conditions Division 0 and Division 1 Specification Sections apply to the work of this Section

B. Provide complete all work and requirements as defined under **Division 1 - GENERAL REQUIREMENTS.** Division 1 – General Requirements Specification Sections apply to all contracts, unless specifically indicated otherwise.

1.2 INTENT

A. The intent of the drawings and these specifications is to provide all systems complete and operative at Homer Central School District. Provide all labor, material, tools, supervision, engineering, equipment, scaffolding, layout, deliveries, trucking, hoisting, rigging, excavation and backfill, shop drawings, submittals and all other items related and required to complete all work in accordance with the Contract Documents and all applicable codes having jurisdiction. The Contractor represents they have expertise in the performance of work for this trade and shall assure all systems to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.3 DRAWING LISTING

A. Refer to the List of Drawings, Table of Contents and Scope of Work below as it relates to this Contract. This Contractor shall review all other Contract drawings for coordination of his work with the work of other prime Contracts.

1.4 SCOPE OF WORK

A. The drawings and specifications are intended as guides and do not relieve the Contractor of the responsibility of reviewing all drawings and specifications for bidding and coordinating with other Contractors during construction. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor, equipment, and incidentals.

B. **The General Construction Contractor (GC) shall provide the following required submittals <u>three weeks after the signed Letter of Intent and/or Contract</u>:**

1. 08 11 16 – Aluminum Doors and Frames
2. 08 12 13 – Hollow Metal Frames
3. 08 14 16 – Flush Wood Doors
4. 08 43 13 – Aluminum-Framed Storefronts
5. 08 51 13 – Aluminum Windows
6. 08 71 00 – Door Hardware
7. 09 65 00 – Resilient Flooring
8. 09 84 30 – Sound-Absorbing Wall and Ceiling Units
9. 12 66 13 – Telescoping Bleachers

SECTION 01 10 10 GC
SUMMARY OF WORK – GENERAL CONSTRUCTION CONTRACT

C. **Provide complete the work of Division 01 – GENERAL REQUIREMENTS**
1. Inclusive of all Division 1 Specification Sections.
2. **01 10 00** – **GENERAL SUMMARY OF WORK**

D. **Provide complete the work of Division 02 – EXISTING CONDITIONS**

C. **Provide complete the work of Division 03 – CONCRETE**

D. **Provide complete the work of Division 04 – MASONRY**

E. **Provide complete the work of Division 05 – METALS**

F. **Provide complete the work of Division 06 – WOOD, PLATICS AND COMPOSITES**

G. **Provide complete the work of Division 07 – THERMAL AND MOISTURE PROTECTION**
(a) Exclusion: Section 07 53 00 – Elastomeric Membrane Roofing
(b) Exclusion: Section 07 62 00 – Sheet Metal Flashing and Trim
(c) Exclusion: Section 07 71 00 – Roof Specialties
(d) Exclusion: Section 07 72 00 – Roof Accessories

H. **Provide complete the work of Division 08 – OPENINGS**

I. **Provide complete the work of Division 09 – FINISHES**

J. **Provide complete the work of Division 10 – SPECIALTIES**

K. **Provide complete the work Division 11 – EQUIPMENT**

L. **Provide complete the work Division 12 – FURNISHINGS**

M. **Provide complete the work of Division 13 – SPECIAL CONSTRUCTION**

N. **Miscellaneous General Construction Scope of Work:**

1. General Construction Labor Hours Allowance
(a) Provide an Allowance of 100 laborer hours to provide clean up and miscellaneous tasks at the direction of the Construction Manager. These laborer hours are in addition to the Contingency Allowance and in addition to SECTION 01 74 19 – Construction Waste Management and Disposal.

1.5 TEMPORARY FACILITIES

A. Refer to **SPECIFICATION SECTION 01 10 00 – GENERAL SUMMARY OF WORK** and **SPECIFICATION SECTION 01 51 00 – TEMPORARY FACILITIES** –for general as well as specific items to be provided by the General Construction Contractor. Specifically included, without limiting the generality of the drawings and specifications are:

1. Provide complete temporary construction laydown and parking areas, temporary access roads, and fencing, including all gates with chains and locks at each, for construction as shown on the SITE LOGISTICS PLANS (**Section 01 32 00 –**

SECTION 01 10 10 GC
SUMMARY OF WORK – GENERAL CONSTRUCTION CONTRACT

Construction Schedules, Phasing Plans and Site Logistics) and as described on any other Contract Drawings.

a. The fencing shall be chain link fence eight (8) foot high panel sections.
b. The GC shall stockpile topsoil removed from the laydown areas at for restoration following removal of the laydown areas. Review locations with Construction Manager.

c. Construction Laydown areas shall be constructed of 2" stone over fabric, no less than 6" deep for all laydown areas. Any material lay-down and parking areas which are on existing pavement surface must be protected by the General construction contractor (GC) against damage created from storage containers and heavy materials.

    i. The laydown areas are for the use of all trades.

d. The General Construction Contractor shall provide temporary fencing, storage and signage as required for areas beyond those shown on site logistics drawings for all work under the GC Contract.

e. The General Construction Contractor shall maintain all temporary construction parking areas, temporary access roads and fences for the duration of the project. At the end of construction, the General Construction Contractor shall remove temporary fencing, temporary access roads, and stone.

f. The General Construction Contractor shall repave, re-grade and seed existing areas disturbed as required to return the area to its original or specified condition.

2. Temporary Office for Construction Manager:

a. General Construction Contractor (GC) is to provide temporary office space at the Homer Intermediate/Junior High School at the locker room renovation area.
    i. 100 LF of Partition Type 3
    ii. 2 ea. 3'-0" Hollow Metal Doors & Frames with locking hardware as located by Construction Manager.

b. Provide and install two (2) type 15# ABC type fire extinguishers with wall mounts.

c. Provide a 4' x 8' whiteboard.

d. Provide a 4' x 8' plan table.

e. Two (2) 8' x 30" folding tables

f. Two (2) 4' x 30" folding tables

g. Two (2) swivel type, adjustable office desk chairs, equal to HON model number 2072BW19T.

SECTION 01 10 10 GC
SUMMARY OF WORK – GENERAL CONSTRUCTION CONTRACT

h. Hang banners and signs as directed by Construction Manager. Banners to be furnished by others.

i. Lease Ricoh copier, model MPC 5503 through Ricoh or approved equal for twenty-two (22) months. The lease cost is $350/mo. Furnish fifteen (15) black ink and seven (7) of each color cartridges.

j. The following new equipment is to be purchased by the General Construction Contractor (GC) for use by the Construction Manager and shall become property of the School District upon completion of the project. This equipment is to be included in the General Construction Contractor (GC) bid. The General Construction Contractor (GC) shall provide two (2) catalog cuts on the equipment listed below to the Construction Manager for their approval prior to purchasing.

    i. Provide one (1) Water Cooler (Hot & Cold), with scheduled water and cups delivery as required for the duration of the project, until the project is closed out.

    ii. Provide Zee medical first responder kit.

k. Provide weekly independent janitorial services for the Construction Manager's temporary office.
    i. This will include but not be limited to general dusting, emptying of trash cans, disposal of trash, vacuuming and sweeping of floors.

3. Provide complete installation and removals of all exterior/interior temporary partitions and doors for dust and weather protection as required to minimize disruption to any occupied space as it pertains to this contract. Refer to **SPECIFICATION SECTION 01 51 00 – TEMPORARY FACILITIES AND CONTROLS.** These partitions and doors shall be maintained through the duration of the project. The General Construction Contractor shall remove these partitions at the end of construction or as directed by the Construction Manager.

4. The General Construction Contractor shall be responsible to provide snow, ice removal and grass maintenance as required to maintain safe access to all the construction sites. Any snow accumulation of 3" or more shall be removed. Any ice conditions shall be sanded or removed to maintain safe passage into the construction areas. Mowing of grass shall be done to prevent the area from becoming an eye sore.

5. The General Construction Contractor shall provide and maintain temporary heating and ventilation for buildings under renovation in accordance with the requirements outlined in **SPECIFICATION SECTION 01 51 00 – TEMPORARY FACILITIES AND CONTROLS**. The Electrical Contractor shall provide temporary power for temporary heating equipment.

SECTION 01 10 10 GC
SUMMARY OF WORK – GENERAL CONSTRUCTION CONTRACT

1.6 CONTINUITY OF UTILITY SERVICES

A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever The General Construction Contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. The General Construction Contractor shall plan and schedule any change or alteration to an existing utility service with Construction Manager and Owner. Such planning, timing, and/or scheduling shall be approved by both of these parties.

B. Provide complete all arrangements, pay fees, and obtain permits to schedule shut downs, disconnections or relocations. Schedule any such occurrences at least 48 hours in advance with the Construction Manager.

1.7 CUTTING AND PATCHING

A. This Contractor shall provide cutting and patching as described per **SPECIFICATION SECTION 01 73 10 – CUTTING AND PATCHING.**

B. Piping and Conduit Penetrations / Roof Penetrations / Equipment Curbs.
1. Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK**.

1.8 PENETRATIONS THROUGH FIRE RATED CONSTRUCTION

A. All piping, ductwork and conduit penetrations in new construction shall be sleeved. These sleeves shall be furnished by the trade responsible for the penetration and delivered to the General Construction Contractor.

B. All piping, ductwork and conduit penetrations in existing partitions shall be sleeved. These sleeves shall be furnished and installed by the trade responsible for the penetration.

C. All piping penetrations through fire rated partitions, walls floors, etc. shall be installed as follows; penetration shall be oversized ½" to ¾" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.' or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

1.9 CLEANING UP

A. This Contractor shall refer to **SECTION 01 74 19 – Construction Waste Management and Disposal** for general as well as specific items to be provided by the General Construction Contractor.

B. The General Construction shall conduct a final cleaning of all areas, including, but not limited to, floors, walls, windows (inside and out), surfaces, etc. before turnover to the Owner.

1.10 CLOSE OUT

A. This Contractor shall comply with **SECTION 01 77 00 – PROJECT CLOSEOUT**.

SECTION 01 10 10 GC
SUMMARY OF WORK – GENERAL CONSTRUCTION CONTRACT

1.11 COORDINATION

A. This Contractor shall comply with **SECTION 01 70 00 – EXECUTION and CLOSEOUT REQUIREMENTS.**

END OF SUMMARY OF WORK
GENERAL CONSTRUCTION CONTRACT

SECTION 01 10 20
SUMMARY OF WORK – Plumbing Contract (PC)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract including the General and Supplementary General Conditions, Division 0 and Division 1 Specification Sections apply to the work of this Section.

Provide complete all work and requirements as defined under **Division 1 - GENERAL REQUIREMENTS.** Division 1 – General Requirements Specification Sections apply to all Contracts, unless specifically indicated otherwise.

1.2 INTENT

The intent of the drawings and these specifications is to provide all systems complete and operative at Homer Central School District. Provide all labor, material, tools, supervision, engineering, equipment, scaffolding, layout, deliveries, trucking, hoisting, rigging, excavation and backfill, shop drawings, submittals and all other items related and required to complete all work in accordance with the Contract Documents and all applicable codes having jurisdiction. The Contractor represents they have expertise in the performance of work for this trade and shall assure all systems to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.3 DRAWING LISTING

Refer to the Drawing Lists, Table of Contents and Scope of Work below as it relates to this Contract. This Contractor shall review all other Contract drawings for coordination of his work with the work of other prime Contracts.

1.4 SCOPE OF WORK

The drawings and specifications are intended as guides and do not relieve the Contractor of the responsibility of reviewing all drawings and specifications for bidding and coordinating with other Contractors during construction. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.

A. **Division 01 – General Requirements**
   1. Inclusive of all Division 01 Specification Sections.
   2. **SECTION 01 10 00 – GENERAL SUMMARY OF WORK.**

C. **Division 03 – Concrete:**
   1. The Plumbing Contractor is responsible for all concrete work, i.e. mechanical equipment pads and interior equipment housekeeping pads as it pertains to their Scope of Work. Submit concrete design mix prior to placing concrete. Comply with Division 03 requirements for this work.

D. **Division 7 – Thermal and Moisture Protection:**
   1. Provide complete the work of **SECTION 07 84 00 – FIRESTOPPING** as it pertains to this contract.

SECTION 01 10 20 PC
SUMMARY OF WORK – Plumbing Contract

2. Provide complete the work of **SECTION 07 92 00 JOINT SEALERS** as it pertains to this contract.

E. **Provide complete the work of Division 22 – PLUMBING:**

F. **Miscellaneous Plumbing Scope of Work**:

1. Provide all plumbing fixtures, drains, piping, equipment, hangers, insulation, labeling, supports, and associated accessories for a complete installation. Provide all required air and water pressure testing as required.

2. All Plumbing demolition and removals. Cut, cap and make safe all piping entering demolished portions of the existing building. The Plumbing Contractor will refer to all demolition notes on drawings for work related to their Contract. Refer to Asbestos Abatement Drawings for all asbestos related work to be done by General Construction Contractor.

3. Provide all access doors to concealed plumbing equipment and controls for the General Construction Contractor to install.

4. Provide complete all terminations, removals and tie-ins as required. Include any necessary premium time or shift work as required by the schedule in order to complete required terminations, tie-ins, removals or relocations.

5. The Plumbing Contractor shall note that this is a phased construction and occupancy project. It is this Contractor's responsibility to provide, install and later remove any temporary tie-ins/disconnects, pipes, valves, pumps, etc. that may be required to occupy each phase of the building.

6. Provide complete weather protection for all plumbing openings in outside walls, slabs and roof openings or where other plumbing devices or pipe are removed. Patches must be maintained weather-tight and finished in a way acceptable to the Construction Manager, Architect and Owner. Any water damage to the existing structure and finishes resulting from core drilling or openings not maintained watertight related to plumbing work will be the responsibility of the Plumbing Contractor.

7. Provide complete, unless otherwise indicated, supports for all equipment provided under this Contract. Each support shall be built in accordance with the requirements of the individual machine or apparatus and approved by the Architect.

8. All motors and controllers specified to be factory mounted and wired shall be purchased with equipment. Field installation of equipment controls and wiring specified to be "factory mounted" will not be allowed. Where miscellaneous electrical devices are to be supplied to the Electrical Contractor, the Plumbing Contractor is responsible for forwarding a copy of a signed receipt to the Construction Manager.

9. Provide complete all final connections of piping to equipment provided by others.

10. Removal and reinstallation of any existing ceilings materials for installation of this Contract's work shall be by the Plumbing Contractor.

SECTION 01 10 20
SUMMARY OF WORK – Plumbing Contract (PC)

F. **Division 31 – SITE WORK:**
1. Provide complete the work of **SECTION 31 23 16.13 - TRENCHING** – Excavation, Backfilling, and Compacting as it pertains to their work including but not limited to:
a. Provide complete all tie-ins to storm, sanitary, fuel oil, and domestic water systems as installed by the General Construction Contractor or utility. This Prime Contractor must make permanent connections to all systems that have been stubbed within 5'-0" of the building. Coordinate final utility stub locations with the General Construction Contractor.

G. Provide excavation, backfill, and compaction for all new underground plumbing systems including all offsite spoil removal. All backfill shall be brought up to the subgrade elevations.

1.5 TEMPORARY FACILITIES

A. Refer to **SPECIFICATION SECTION 01 10 00 – SUMMARY OF WORK** – Separate Prime Contracts and **SPECIFICATION SECTION 01 51 00 – TEMPORARY FACILITIES** – Temporary Facilities for general as well as specific items to be provided by the Plumbing Contractor.
1. The Plumbing Contractor shall provide and maintain temporary water service. A minimum of two (2) hose outlets is required. The Plumbing Contractor shall provide a back flow prevention device to prevent contaminated water from backing up into the school's domestic water system at these locations. Locations of these outlets to be approved by the Construction Manager. Each Contractor is responsible for providing hoses for their own use. The Plumbing Contractor shall remove the temporary connections when and as directed by the Construction Manager.

1.6 CONTINUITY OF UTILITY SERVICES

A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this Contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This Contractor shall plan and schedule any change or alteration to an existing utility service with Construction Manager and Owner. Such planning, timing, and/or scheduling shall be approved by both of these parties.

B. Provide complete all arrangements, pay fees, and obtain permits to schedule shut downs, disconnections or relocations. Schedule any such occurrences at least 48 hours in advance with the Construction Manager.

1.6 CUTTING AND PATCHING

A. This Contractor shall provide cutting and patching per **SECTION 01 73 10 – CUTTING AND PATCHING.**

B. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 GENERAL SUMMARY OF WORK**.

1.08 TESTING AND INSPECTION

SECTION 01 10 20 PC
SUMMARY OF WORK – Plumbing Contract

A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.

B. Required local or municipal inspections - Process and present Owner with certificate indicating approval of such governing bodies.

C. Tests
1. After installations are completed and before insulation is applied, walls are closed, or trenches backfilled, all portions of the installation shall be tested in accordance with the procedures described herein.

D. Provide hydrostatic pressure test for storm water, sanitary and vent pipe with 10 feet or more developed length. Test procedure shall be per the technical specifications or as a minimum of 10-foot water column at all points except the upper most portion of the roof vent or drain terminal. Piping shall be tested in sections with approved test plugs, duration of the test shall be one hour. In addition to the pressure test described above, Contractor shall provide a flow test for each section of the plumbing drainage systems to verify that there are no blockages. All pipes must be exposed during testing unless otherwise approved by the Engineer.

E. Interior domestic water piping shall be tested per the technical specifications or as a minimum at 125-psi pressure. Contractor shall fill piping at the beginning of working day and maintain pressure for two hours with no pressure loss. If no leaks are found, the piping shall be allowed to remain under pressure overnight and then be inspected the next morning. No insulation shall be applied to the piping until the test is complete.

F. Submit completed testing form for piping found in Specification Section 00 8520 – Project Forms and Documents, to the Construction Manager following completion of the testing for verification.

1.09 IDENTIFICATION AND NAMEPLATES

A. Provide engraved plastic labels screwed to equipment furnished under this contract including control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8” high, self-adhesive labels or punch tape type labels are not acceptable.

1.10 PENETRATIONS THROUGH FIRE RATED CONSTRUCTION

A. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK.**

1.11 CLEANING UP

A. This Contractor shall comply with **SECTION 01 74 00 – PROGRESS CLEANING**.

1.12 CLOSE OUT

A. This contractor shall comply with **SECTION 01 77 00 – PROJECT CLOSEOUT.**

SECTION 01 10 20
SUMMARY OF WORK – Plumbing Contract (PC)

1.13 COORDINATION

A. This Contractor shall comply with **SECTION 01 31 00 – PROJECT COORDINATION.**

END OF SUMMARY OF WORK
PLUMBING CONTRACT

SECTION 01 10 30 HC
SUMMARY OF WORK – HVAC CONTRACT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract including the General and Supplementary General Conditions Division 0 and Division 1 Specification Sections apply to the work of this Section.

Provide complete all work and requirements as defined under **Division 01 - GENERAL REQUIREMENTS.** Division 01 – General Requirements Specification Sections apply to all Contracts, unless specifically indicated otherwise.

1.2 INTENT

The intent of the drawings and these specifications is to provide all systems complete and operative at Homer Central School District. Provide all labor, material, tools, supervision, engineering, equipment, scaffolding, layout, deliveries, trucking, hoisting, rigging, excavation and backfill, shop drawings, submittals and all other items related and required to complete all work in accordance with the Contract Documents and all applicable codes having jurisdiction. The Contractor represents they have expertise in the performance of work for this trade and shall assure all systems to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.3 DRAWING LISTING

Refer to the List of Drawings, Table of Contents and Scope of Work below as it relates to this Contract. This Contractor shall review all other Contract drawings for coordination of its work with the work of other prime Contracts.

1.4 SCOPE OF WORK

The drawings and specifications are intended as guides and do not relieve the Contractor of the responsibility of reviewing all drawings and specifications for bidding and coordinating with other Contractors during construction. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.

A. **The HVAC / Mechanical Contractor (MC) shall provide the following required submittals <u>three weeks after the signed Letter of Intent and/or Contract</u>:**
   1. 23 34 23 – HVAC Power Ventilators
   2. 23 35 13 – Dust Collection Systems
   3. 23 52 17 – Stainless Steel Condensing Boiler
   4. 23 73 13 – Modular Indoor Central-Station Air-Handling Units
   5. 23 81 29 – Variable Refrigerant Volume (VRV) HVAC System
   6. 23 82 00 – Convection Heating and Cooling Units

B. **Division 01 – General Requirements**
   1. Inclusive of all Division 01 Specification Sections.
   2. **SECTION 01 10 00 – GENERAL SUMMARY OF WORK.**

SECTION 01 10 30 HC
SUMMARY OF WORK – HVAC CONTRACT

C. **Division 03 – Concrete**
1. The HVAC Contractor is responsible for all concrete work, i.e. mechanical equipment pads and interior equipment housekeeping pads as it pertains to their Scope of Work. Submit concrete design mix prior to placing concrete. Comply with Division 03 requirements for this work.

D. **Division 07 – Thermal and Moisture Protection**
1. Provide complete the work of **SECTION 07 84 00 – FIRESTOPPING** as it pertains to this contract.
2. Provide complete the work of **SECTION 07 92 00 - JOINT SEALANTS** as it pertains to this contract.

E. **Provide complete the work of Division 23 – Heating, Ventilating and Air-Conditioning (HVAC)**
1. **Exception: HVAC Controls & Programming are furnished by HVAC Controls & Programming Procurement Contractor for Equipment.**
    1. HVAC Contractor shall install control equipment and low voltage cabling for HVAC Controls Equipment.
2. **Miscellaneous HVAC Scope of Work:`**
    1. All HVAC demolition and removals**.** Cut, cap and make safe all piping and ductwork entering demolished portions of the existing building. The HVAC Contractor will refer to all demolition notes on drawings for work related to their Contract. Refer to Asbestos Abatement Drawings for all asbestos related work to be done by General Construction Contractor.
    2. Chemical water treatment system per Specifications.
    3. Provide complete, all required fire dampers in locations where ducts pass through fire rated structural floor slabs, partitions and walls. Install in accordance to manufacturer's recommendations utilizing steel sleeves and angles.
    4. The HVAC Contractor will provide all access doors to concealed HVAC equipment and controls for the General Construction Contractor to install.
    5. Removal and reinstallation of any existing ceilings for installation of work by this Contractor shall be by the HVAC Contractor.
    6. The HVAC Contractor shall note that this is a phased construction and occupancy project. It is this Contractor’s responsibility to provide, install and later remove any temporary tie-ins/disconnects, pipes, valves, pumps, etc. that may be required to occupy each phase of the building.
    7. Provide complete, unless otherwise indicated, supports for all equipment provided under this Contract. Each support shall be built in accordance with the requirements of the individual machine or apparatus and approved by the Architect.
    8. All motors and controllers specified to be factory mounted and wired shall be purchased with equipment. Field installation of equipment controls and wiring specified to be "factory mounted" will not be allowed. Where miscellaneous electrical devices are to be supplied to the Electrical Contractor, the HVAC Contractor is responsible for forwarding a copy of a signed receipt to the Construction Manager.
    9. Provide complete all final connections of piping and/or ductwork to equipment provided by others.
    10. Provide complete the protection for all HVAC equipment, pipe and duct openings, whether loose or installed, to prohibit the contamination by foreign material during all work phases in a manner acceptable to the Construction Manager. If proper protection has not been enforced, an independent

cleaning Contractor shall be employed by the HVAC Contractor to clean systems in a manner acceptable to the Construction Manager at no cost to the Owner.

11. Temporary Closure: Provide temporary closure of polyethylene film or other covering at ends of ductwork which are not connected to equipment or air distribution devices which will prevent entrance of dust and debris until such time connections are made.
12. Provide all HVAC ductwork, filters, valves, dampers, equipment, pumps, insulation, labeling, piping, hangers, supports, drains and associated accessories as necessary to provide a complete installation of HVAC components. Provide all air and water pressure testing as required.

1.5 TEMPORARY FACILITIES

A. Refer to **SECTION 01 10 00- GENERAL SUMMARY OF WORK** – Separate Prime Contracts and **SPECIFICATION SECTION 01 51 00 – TEMPORARY FACILITIES** – Temporary Facilities for general as well as specific items to be provided by the HVAC Contractor.

1.6 CONTINUITY OF UTILITY SERVICES

A. It is of paramount importance that each utility service operates continuously and without interruption. Whenever this Contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This Contractor shall plan and schedule any change or alteration to an existing utility service with Construction Manager and Owner. Such planning, timing, and/or scheduling shall be approved by both of these parties.

B. Provide complete all arrangements, pay fees, and obtain permits to schedule shut downs, disconnection's or relocations. Schedule any such occurrences at least 48 hours in advance with the Construction Manager.

1.7 CUTTING AND PATCHING

A. This Contractor shall provide cutting and patching per **SECTION 01 73 10 – CUTTING AND PATCHING.**

B. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK.**

1.8 TESTING AND INSPECTION

A. Provide complete all labor for the complete testing and commissioning of all HVAC and related electrical systems.

B. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.

C. Required local or municipal inspections - Process and present Owner with certificate indicating approval of such governing bodies.

SECTION 01 10 30 HC
SUMMARY OF WORK – HVAC CONTRACT

D. Tests
   1. After installations are completed and before insulation is applied, walls are closed, or trenches backfilled, all portions of the installation shall be tested in accordance with the procedures described within the technical specifications.

E. This Contractor shall submit a written start-up reports to Architect, copy to Construction Manager, on results of each inspection or test on system or equipment supplied. Start-up reports shall contain all pertinent information recommendations, approvals, additional work required, etc. These start-up reports shall also be included in the Operation and Maintenance Manuals per Section

1.9 IDENTIFICATION AND NAMEPLATES

A. Provide engraved plastic labels screwed to equipment furnished under this Contract including control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self-adhesive labels or punch tape type labels are not acceptable.

1.10 PENETRATIONS THROUGH FIRE RATED CONSTRUCTION

A. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK.**

1.11 CLEANING UP

A. This Contractor shall final clean all areas designated as mechanical rooms and all equipment, air handling units, fans, unit heaters, etc. and all other material partial to this Contract to the satisfaction of the Construction Manager and Division 1 Requirements. This Contractor shall comply with **SPECIFICATION SECTION 01 74 00 – PROGRESS CLEANING.**

1.12 CLOSE OUT

A. This contractor shall comply with **SPECIFICATION SECTION 01 70 00 – EXECUTION AND CLOSEOUT REQUIREMENTS.**

1.13 COORDINATION

A. This Contractor shall comply with **SPECIFICATION SECTION 01 31 00 – PROJECT COORDINATION.**

END OF SUMMARY OF WORK
HVAC CONTRACT

SECTION 01 10 40
SUMMARY OF WORK – ELECTRICAL CONTRACT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract including the General and Supplementary General Conditions Division 0and Division 1 Specification Sections apply to the work of this Section.

Provide complete all work and requirements as defined under **Division 01 - GENERAL REQUIREMENTS.** Division 1 – General Requirements Specification Sections apply to all Contracts, unless specifically indicated otherwise.

1.2 INTENT

The intent of the drawings and these specifications is to provide all systems complete and operative at Homer Central School District. Provide all labor, material, tools, supervision, engineering, equipment, scaffolding, layout, deliveries, trucking, hoisting, rigging, excavation and backfill, shop drawings, submittals and all other items related and required to complete all work in accordance with the Contract Documents and all applicable codes having jurisdiction. The Contractor represents they have expertise in the performance of work for this trade and shall assure all systems to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.3 DRAWING LISTING

Refer to the Drawing Index, Specification Index and Scope of Work below as it relates to this Contract. This Contractor shall review all other Contract drawings for coordination of its work with the work of other prime Contracts.

1.4 SCOPE OF WORK

The listing of Drawings and Specifications is intended as a guide and does not relieve the Contractor of the responsibility of reviewing all Drawings and Specifications for bidding and coordinating with other contractors during construction. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.

A. **Division 01 – General Requirements:**
   1. Inclusive of all Division 01 Specification Sections.
   2. **SECTION 01 10 00 –GENERAL SUMMARY OF WORK**.

B. **Division 03 – Concrete:**
   1. The Electrical Contractor is responsible for all concrete work, i.e. mechanical equipment pads and interior equipment housekeeping pads as it pertains to their Scope of Work. Submit concrete design mix prior to placing concrete. Comply with Division 03 requirements for this work.

C. **Division 07 – Thermal and Moisture Protection:**
   1. Provide complete the work of **SECTION 07 84 00 – FIRESTOPPING** as it pertains to this contract.
   2. Provide complete the work of **SECTION 07 92 00 - JOINT SEALERS** as it pertains to this contract.

SECTION 01 10 40
SUMMARY OF WORK – ELECTRICAL CONTRACT

D. **Division 10 – SPECIALTIES**
   1. Provide complete the electrical power connections for work.

E. **The General Construction Contractor (GC) shall provide the following required submittals <u>three weeks after the signed Letter of Intent and/or Contract</u>**
   1. 26 51 00 – Interior Lighting
   2. 26 56 00 – Exterior Lighting
   3. 27 11 16 – Communications Cabinets, Racks, Enclosures, & Accessories
   4. 27 15 23 – Communications Optical Fiber Cabling
   5. 28 31 00 – Addressable Fire Alarm System

F. **Provide complete the work of Division 26 – Electrical.**

G. **Miscellaneous Electrical Scope of Work**:
   1. Provide all fixtures, devices, conduit, wire, hangers, supports, labeling, panel boxes, equipment, raceways and special systems including all necessary accessories and components for a complete installation.
   2. Provide weather tight protection for all electrical related openings in outside walls, slabs, and roofs when pipe or other electrical devices are removed or installed.
   3. The Electrical Contractor is responsible to make all final connections to equipment provided by others. Coordinate with other Trade Contractors to verify electrical characteristics of equipment supplied is compliant with electrical requirements shown on the Contract Documents.
   4. This is a phased construction and occupancy project. It is the Electrical Contractor's responsibility to furnish, install and later remove any temporary tie-ins, disconnects, conduits, etc. that may be required to occupy each phase on construction.
   5. Provide coordination as it pertains to Specification Section 008710 Finish Hardware.
   6. All Temperature Control Wiring will be provided by the HVAC Contractor.
   7. Include removal of primary cables and conduits for existing electrical utility service.

H. **Provide complete the work of Division 27 – Communications**

I. **Provide complete the work Division 28 – Electronic Safety and Security**

J. **Division 31 – EARTHWORK:**
   1. Provide complete the work of **SECTION 31 23 16.13 - TRENCHING** – Excavation, Backfilling, and Compacting as it pertains to their work including but not limited to:
      a. Include all excavation, spoil removal, conduit, wire, site lighting, duct-banks, backfill, and grade restoration.
      b. Patching of all existing streets, curbs, parking lots, lawns, and sidewalks to existing condition as required to tie-in site electrical systems.

1.5 **TEMPORARY FACILITIES**
A. Refer to **SECTION 01 10 10 – GENERAL SUMMARY OF WORK** – Separate Prime Contracts and SECTION **01 51 00 – TEMPORARY FACILITIES** – Temporary Facilities for general as well as specific items to be provided by the Electrical Contractor.
B. Electrical Contractor shall establish temporary power for Construction Manager's Trailer and provisions for four (4) temporary power services as indicated on the Site Logistics Plans.

SECTION 01 10 40
SUMMARY OF WORK – ELECTRICAL CONTRACT

1.7 CONTINUITY OF UTILITY SERVICES

A. It is of paramount importance that each utility service operates continuously and without interruption. Whenever this Contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This Contractor shall plan and schedule any change or alteration to an existing utility service with Construction Manager and Owner. Such planning, timing, and/or scheduling shall be approved by both of these parties.

B. Provide complete all arrangements, pay fees, and obtain permits to schedule shut downs, disconnection's or relocations. Schedule any such occurrences at least 48 hours in advance with the Construction Manager.

1.8 CUTTING AND PATCHING

A. This Contractor shall provide cutting and patching per **SECTION 01 73 10 – CUTTING AND PATCHING.**

B. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK.**

1.9 TESTING AND INSPECTION

A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.

B. New York Board of Fire Underwriters representative shall inspect completed installation and present Owner with Certificate of Inspection showing approval.

C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.

D. Tests
   1. After installations are completed and before insulation is applied, walls are closed, or trenches backfilled, all portions of the installation shall be tested in accordance with the procedures described herein.

E. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.

F. Contractor is responsible to check rotation on all three-phase equipment prior to turning on equipment for temporary or permanent use.

G. Panelboard, Circuit Breaker, Transformer and Fuse Tests
   - Energize all possible lighting and equipment loads for a period of not less than eight hours.
   - Check all fuses and circuit breakers for faulty tripping and excessive heat.
   - Tabulate phase current on all feeders.
   - Tabulate voltages at each panelboard (phase to phase and phase to neutral)
   - Reconnect branch circuits that vary over 5% between high and low current.
   - Reconnect transformer taps as required to adjust for high or low voltages.

SECTION 01 10 40
SUMMARY OF WORK – ELECTRICAL CONTRACT

- All tabulation sheets shall be presented to the Architect for approval, make any correction determined by the Architect.

1.10 IDENTIFICATION AND NAMEPLATES

A. Provide engraved plastic labels screwed to equipment furnished under this Contract including control panels, starters, disconnect switches, panelboards, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self-adhesive labels or punch tape type labels are not acceptable

1.11 LOOSE EQUIPMENT

A. Obtain a receipt, in duplicate, for loose equipment delivered to Owner's Agent. Obtain receipts for the following per technical specifications but as a minimum:
- 2 – Keys for each panelboard; special equipment cabinets., etc.
- Spare fuses, three (3) of each amperage rating used.
- Other equipment not permanently attached to the building structure.

1.12 PENETRATIONS THROUGH FIRE RATED CONSTRUCTION

A. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK**.

1.12 CLEANING UP

A. This Contractor shall comply with **SECTION 01 74 00 – PROGRESS CLEANING.**

1.13 CLOSE OUT

This contractor shall comply with **SECTION 01 70 00 – EXECUTION AND CLOSEOUT REQUIREMENTS.**

1.14 COORDINATION

A. This Contractor shall comply with **SECTION 01 31 00 – PROJECT COORDINATION.**

B. Provide complete coordination with local Utility Company any shutdowns, relocations or disconnection/ reconnections. Include any utility company fees. Coordinate any required shutdowns at least 48 hours in advance with the Construction Manager. Include any premium time required to make such terminations or reconnections as required by the schedule.

C. The Electrical Contractor shall be responsible for all power circuits and final connections to all equipment provided by others. Coordinate with the other Trade Contractors to verify that equipment matches the characteristics of the service being supplied.

END OF SUMMARY OF WORK
ELECTRICAL CONTRACT

SECTION 01 10 50
SUMMARY OF WORK – SITE WORK CONTRACT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract including the General and Supplementary General Conditions Division 0 and Division 1 Specification Sections apply to the work of this Section.

Provide complete all work and requirements as defined under **Division 01 - GENERAL REQUIREMENTS.** Division 1 – General Requirements Specification Sections apply to all Contracts, unless specifically indicated otherwise.

1.2 INTENT

The intent of the drawings and these specifications is to provide all systems complete and operative at Homer Central School District. Provide all labor, material, tools, supervision, engineering, equipment, scaffolding, layout, deliveries, trucking, hoisting, rigging, excavation and backfill, shop drawings, submittals and all other items related and required to complete all work in accordance with the Contract Documents and all applicable codes having jurisdiction. The Contractor represents they have expertise in the performance of work for this trade and shall assure all systems to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

1.3 DRAWING LISTING

Refer to the Drawing List, Table of Contents and Scope of Work below as it relates to this Contract. This Contractor shall review all other Contract drawings for coordination of its work with the work of other prime Contracts.

1.4 SCOPE OF WORK

The listing of Drawings and Specifications is intended as a guide and does not relieve the Contractor of the responsibility of reviewing all Drawings and Specifications for bidding and coordinating with other contractors during construction. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.

A. **Division 01 – General Requirements:**
   1. Inclusive of all Division 01 Specification Sections.
   2. **SECTION 01 10 00 –GENERAL SUMMARY OF WORK**.

1. **Provide complete the work of Division 31 – EARTHWORK**

2. **Provide complete the work of Division 32 – EXTERIOR IMPROVEMENTS**

3. **Provide complete the work of Division 33 – UTILITIES**

1.5 TEMPORARY FACILITIES

1.6 CONTINUITY OF UTILITY SERVICES

A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this Contractor plans to make changes or alterations to any existing

SECTION 01 10 50
SUMMARY OF WORK – SITE WORK CONTRACT

utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This Contractor shall plan and schedule any change or alteration to an existing utility service with Construction Manager and Owner. Such planning, timing, and/or scheduling shall be approved by both of these parties.

B. Provide complete all arrangements, pay fees, and obtain permits to schedule shut downs, disconnection's or relocations. Schedule any such occurrences at least 48 hours in advance with the Construction Manager.

1.7 CUTTING AND PATCHING

A. This Contractor shall comply with **SECTION 01 73 10 – CUTTING AND PATCHING**

1.8 TESTING AND INSPECTION

A. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.

1.9 LOOSE EQUIPMENT

A. Obtain a receipt, in duplicate, for loose equipment delivered to Owner's Agent. Refer to drawings and specifications for schedules for equipment.

1.10 PENETRATIONS THROUGH FIRE RATED CONSTRUCTION

A. Through wall and roofing penetrations: Refer to **SECTION 01 10 00 – GENERAL SUMMARY OF WORK**.

1.11 CLEANING UP

A. This Contractor shall comply with **SECTION 01 74 00 – PROGRESS CLEANING.**

1.12 CLOSE OUT

A. This contractor shall comply with **SECTION 01 70 00 – EXECUTION AND CLOSEOUT REQUIREMENTS.**

1.13 COORDINATION

A. This Contractor shall comply with **SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION.**

END OF SUMMARY OF WORK
SITE WORK CONTRACT

SECTION 01 10 60
INSTRUCTIONS TO PROPOSERS
ROOFING

PART 1 COMPETITION PROCESS

1.1 PROJECT SCHEDULE

A. See Section 01 32 00 – Construction Schedules, Phasing & Site Logistics.

B. Attendance at pre-proposal briefings and site tours is mandatory.

1.2 REQUEST FOR QUALIFICATIONS

A. The Request for Qualifications documents consist of:
   1. The Request for Qualifications.
   2. The Instructions to Proposers.
   3. The Summary Project Description, including:
      a. Site Description.
      b. Program Narrative.
      c. Building Area Summary.
      d. Preliminary Project Budget.
      e. Summary of Agreement and Contract terms.

B. Qualifications Statement Submission: Date as indicated in schedule above.
   1. Location: Email to Joshua Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com, Paige Holenbeck at paige@bepservices.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 Digital Copy

C. Acceptance and Rejection: Owner reserves the right to pre-qualify or reject proposers as unqualified, including without limitation the right to reject nonconforming, nonresponsive, unbalanced, or conditional qualifications. Owner reserves the right to reject the qualifications of any proposer if Owner believes that it would not be in the best interest of the project to make an award to that proposer, whether because the proposer is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

1.3 REQUEST FOR PROPOSALS

A. Related Documents

   1. Drawings and general provisions of the Contract including the General and Supplementary General Conditions and Division 1 Specification Sections apply to the work of this Section.

   2. Provide complete all work and requirements as defined under Division 1 – GENERAL REQUIREMENTS. Division 1 – General Requirements Specification Sections apply to all contracts, unless specifically indicated otherwise.

   3. Per Section 01 51 00 – Temporary Facilities, Roofing Contractor shall provide Temporary Stairs and Railings for all leading-edge conditions for all roofing work.

B. Intent

   1. The intent of the drawings and these specifications is to provide all systems complete and operative at Homer Central School District. Provide all labor, material, tools, supervision, engineering, equipment, scaffolding, layout, deliveries, trucking, hoisting, rigging, excavation and backfill, shop drawings, submittals and all other items related and required to complete all work in accordance with the Contract Documents and all applicable codes having jurisdiction. The Contractor represents

they have expertise in the performance of work for this trade and shall assure all systems to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

C. Scope of Work

1. The drawings and specifications are intended as guides and do not relieve the Contractor of the responsibility of reviewing all drawings and specifications for bidding and coordinating like work with other Contractors during construction. Drawings and Specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this contractor is required to provide each items and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor, equipment, and incidentals.
2. The Roofing Contractor (RC) shall provide the following submittals three weeks after the signed letter of intent and/or Contract:
   a. 06 10 00 – Rough Carpentry
      - All roofing related wood blocking. (Perimeter Wood Blocking, Wood Blocking for curbs, etc..)
   b. 07 53 00 – Elastomeric Membrane Roofing
   c. 07 62 00 – Sheet Metal Flashing and Trim
   d. 07 71 00 – Roof Specialties
   e. 07 72 00 – Roof Accessories
3. Provide complete the work of Division 01 – General Requirements
   a. Inclusive of all Division 1 Specification Sections
   b. 01 10 00 – General Summary of Work
4. Provide complete the work of all Division 06 – WOOD, PLASTICS, COMPOSITES as follows:
   a. Section 06 10 00 – Rough Carpentry for all roofing related wood blocking
      - Perimeter roof edge wood blocking
      - Wood blocking for curbs
5. Provide complete the work of all Division 07 – THERMAL AND MOISTURE PROTECTION as follows:
   a. Section 07 53 00 – Elastomeric Membrane Roofing
   b. Section 07 62 00 – Sheet Metal Flashing and Trim
   c. Section 07 71 00 – Roof Specialties
   d. Section 07 72 00 – Roof Accessories

D. Qualified Proposers: Only those proposers already pre-qualified may receive the Proposal Documents or submit proposals. The individuals or entities that will be providing design professional services must be the same as those listed in the previously accepted qualifications.

E. The RFP Documents will consist of:
1. The Request for Proposal, including:

a. Project Information.
b. The Instructions to Proposers.
c. The Proposal Form.
d. The Agreement and Conditions of the Contract and Contract Definitions.
e. Sample contract forms.

2. The Contract Documents, including:
   a. The Drawings.
   b. The Specifications.

F. Pre-Proposal Briefing(s): Date: January 13, 2023 at 11:00 AM.
   1. Location: Homer CSD – HTEC Building (HS bus garage building)
   2. Only prospective proposers of record will be allowed to attend.

G. Proposal Submission: by January 27, 2023 at 4PM.
   1. Location: Email Proposal to Josh Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com & Paige Holenbeck at paige@bepservices.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 digital copy
      a. 1 hard copy with company seal mailed for record to:
      Homer Central School District
      Attn: Michael Falls - Assistant Superintendent for Management
      PO Box 500
      Homer, New York 13077

H. Proposal Security: Each proposal must be accompanied by proposal security as described in Section 00 51 00 – Performance Bond and Labor and Material Payment Bond (AIA Document A312).

I. Proposals will be opened privately.

J. Acceptance, Award, And Rejection: All proposals will remain subject to acceptance for the time period indicated in Section 00 52 14 – Standard Form of Agreement & Insurance (AIA Document A132), but Owner may, at its sole discretion, release any proposal prior to that date.

K. Execution Of Agreement: When the Owner gives a Notice of Award to the successful proposer, the proposer will be expected to execute the Agreement within 15 days thereafter and deliver the required contract security.

PART 2 EVALUATION

2.1 THE EVALUATORS

A. Evaluation and recommendation will be made by the Owner, and the Owner's project team.

B. Owner may conduct such other investigations as Owner deems necessary to assist in the evaluation of any proposal and to establish the responsibility, qualifications, and financial ability of proposers, proposed design professionals, subcontractors, suppliers, and other individuals and entities to perform the work in accordance with Contract Documents.

2.2 SELECTION CRITERIA

A. Basis of Selection: The successful proposal will be the one that provides the best value to the Owner, based on the price after correction for greater or lesser quality and/or shorter or longer time ("adjusted low bid"), with Contract Amount based on Proposal price, as well as exceptional qualifications.

B. Proposal Exhibits: Submit drawings, specifications, and other data as indicated on the Proposal Form of form and character sufficient to adequately explain the design intent and the character of the proposed construction; incorporate into the exhibits substantiation specified in

the Performance Specifications as to be submitted for the Proposal.

C. Qualifications Criteria: To demonstrate qualifications to perform the work, each proposer must submit written evidence, as called for below.
   1. The individuals or entities that will be providing design professional services must be listed in the Proposal.
   2. See Conditions of the Contract for contract conditions that may affect personnel provided.

PART 3 TERMS AND PROCEDURES

3.1 COPIES OF DOCUMENTS

A. Complete sets of Proposal Documents must be used in preparing proposals. Neither the Owner nor any consultant of the Owner who might have been involved in the preparation of the Proposal Documents assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

B. Proposal Documents will not be issued directly to Sub-proposers unless specifically indicated.

C. The Owner makes copies of the Proposal Documents available on the above terms only for the purpose of obtaining proposals for the work and does not confer any license or grant for any other use.

3.2 QUESTIONS

A. All questions prior to proposal must be received by the close of business on January 17, 2023. Questions shall be directed to Paige Holenbeck at paige@bepservices.com and Josh Bezio at HUNT Engineers, Architects, Surveyors at email bezioj@hunt-eas.com Copy all RFI's to Lee Stepp at LeChase at email lee.stepp@lechase.com. All proposers request for information shall use the form located in specification 00 85 20 – Project Forms & Documents. A digital copy of this form is available upon request.

B. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda faxed or emailed to parties recorded by Owner as having received the Proposal Documents.

C. Proposers may arrange for courier delivery at their own expense.

D. Only questions answered by formal written Addenda will be binding; oral and other interpretations or clarifications will be without legal effect.

E. Addenda may also be issued to modify the Proposal Documents as deemed advisable by the Owner.

3.3 BRIEFINGS

A. Representatives of the Owner will be present to discuss the project.

B. Owner will transmit to prospective proposers of record such Addenda as Owner considers necessary in response to questions arising at the conference.

C. Oral statements made at briefings may not be relied upon and will not be binding or legally effective.

3.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A. It is the responsibility of each proposer, before submitting a proposal, to:

B. Examine the Proposal and Contract Documents thoroughly.

C. Visit the site to become familiar with and satisfy the proposer as to the general, local, and site conditions that may affect cost, progress, or performance of the work.

D. Consider federal, state, and local laws and regulations that may affect cost, progress, and performance of the work.

E. Study and carefully correlate the proposer's knowledge and observations with the Proposal Documents and other related data.

F. Promptly notify the Owner of conflicts, errors, ambiguities, and discrepancies which the proposer has discovered in the Proposal Documents.

3.5 INFORMATION RELATING TO EXISTING CONDITIONS

A. The Owner has identified certain reports and/or tests, which have been utilized by the Owner in preparation of the Proposal Documents.

B. The proposer may rely on the general accuracy of the technical data contained in such reports but not upon other data, interpretations, or opinions contained in such reports, not upon the completeness thereof for the purposes of preparing its proposal, for design, or for construction.

C. Where such reports are not included in the Proposal Documents, copies will be made available by Owner to any proposer on written request.

D. These reports are not part of Contract Documents; the proposer is responsible for any interpretation or conclusion drawn from such reports.

3.6 SUPPLEMENTARY INVESTIGATIONS

A. Before submitting a proposal each proposer will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, or data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise, which may affect cost, progress, or performance of the work, or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by the proposer and safety precautions and programs incident thereto, or which the proposer deems necessary to prepare its proposal for performing the work in accordance with the time, price, and other terms and conditions of Contract Documents.

3.7 WORK AT SITE BY OTHERS

A. See Section 01 10 00 – General Summary of Work and Sections 01 10 10 – General Summary of Work, 01 10 20 – General Construction (GC), 01 10 30 – Plumbing (PC), 01 10 40 – Mechanical (MC / HVAC), 01 10 50 – Site Work (SC) for identification of the general nature of work that is to be performed at the site by Owner or others (such as utility companies & Prime Contractors) that relates to the work for which a proposal is to be submitted.

B. On request, Owner will provide the proposer access to or copies of Contract Documents for such work (other than portions thereof related to price).

3.8 TAXES

A. Owner is exempt from State sales and use taxes on materials and equipment to be incorporated into the work.

B. Do not include said taxes in the Contract Price.

C. See Conditions of the Contract for additional information.

3.9 CONTRACT TIME

A. The time within which the work is to be completed will be incorporated into the Agreement.

B. The apparent successful proposer will be required to satisfy Owner that it will be able to achieve Substantial Completion and final completion within the designated times.

3.10 QUALIFICATION STATEMENT

A. Contractor's Qualification Statement:
   1. Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for the Proposal.
   2. A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

B. Materials larger than 8-1/2 by 11 inches will not be accepted.

C. References: Maximum of 20, verified, with contact name, phone number, and fax number; notify contact person that Owner may request information.

D. Resumes: Maximum of 10 persons; maximum of 2 pages each.

E. Slides: Submit in plastic slide holders punched for 3-ring binder, for viewing without removal from holder.

F. Standard printed brochures are preferable to custom-prepared graphics.

3.11 PROPOSAL FORM

A. Proposal Form: The Proposal Form is included in the Proposal Documents; additional copies may be obtained from the Owner.

B. Fill in blanks on the Proposal Form electronically.
   1. In addition to signatures, enter names electronically.
   2. Show address, telephone number, fax number, and email address for communications regarding the proposal.
   3. Sums shall be expressed in both words and numbers. In case of discrepancy, the amount entered in words shall govern.
   4. All requested Alternates shall be proposed. If no change in the Base Proposal, enter "No Change" in the proposal form.

C. Execute Proposals by partnerships in the partnership name; signed by a partner, whose title must appear under the signature.
   1. Show the official address of the partnership below the signature.

D. Execute Proposals by corporations in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign); affix corporate seal and indicate it has been attested by the secretary or an assistant secretary.
   1. Show corporate address and state of incorporation below the signature.
   2. Attach evidence of authority to conduct business in the state where the work is to be performed If the proposer is an out-of-state corporation.

E. Include an acknowledgement of receipt of issued Addenda on the Proposal Form, including their numbers and dates.

3.12 PROPOSAL EXHIBITS

A. Materials submitted will become the property of the Owner.

B. Owner reserves the right to publish or display publicly submitted exhibits.

3.13 PROPOSAL SUBMISSION

A. Enclose Proposals in an opaque sealed envelope or box, marked with the project title and the designated portion of the project for which it is submitted and the name and address of the proposer.

B. Seal the price proposal in a separate envelope marked "ROOFING PRICE PROPOSAL."

C. If the submission is sent through the mail or other delivery system, enclose the sealed envelope or box in a separate envelope or container marked "QUALIFICATIONS ENCLOSED" or "ROOFING PROPOSAL ENCLOSED" (as applicable).

D. Include Exhibits indicated on the Proposal Form in the same envelope or box; clearly identify each separate item with the proposer's name and project name.

3.14 PROPOSAL SECURITY

A. Proposal security must be in the form of a certified or cashier's check.

B. The proposal security of the successful proposer will be retained until such proposer has executed the Agreement, furnished any required contract security, and met the other conditions of the Notice of Award, whereupon the proposal security will be returned.

C. If the successful proposer fails to execute and deliver the Agreement and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the proposal security of that proposer will be forfeited.

D. The proposal security of proposers whose proposal is not considered competitive will be returned within 7 days after the proposal opening.

3.15 DISQUALIFICATION

A. Any proposer may be disqualified due to breach of proposal procedures, modification of proposal after submission, or withdrawal of proposal after submission.

B. Disqualification will result in forfeiture of proposal security.

3.16 SUBMITTALS

A. After notification of selection for the award of the Contract, the Proposer shall, as soon as practicable or as stipulated in the Contract Documents, submit in writing to the Owner through the Construction Manager & Architect via Procore & Newforma:
   1. a designation of the Work to be performed with the Proposer’s own forces;
   2. names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
   3. names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
   4. a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 29 00 – Payment Procedures.

B. The Proposer will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Contract Documents.

C. Prior to the execution of the Contract, the Architect will notify the Proposer if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may, at the Proposer’s option, withdraw the Proposal or submit an acceptable substitute person or entity. The Proposer may also submit any required adjustment in the Base Proposal or Alternate Proposal to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted proposal price or disqualify the Proposer.

D. Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

3.17 PERFORMANCE BOND AND PAYMENT BOND

A. Bond Requirements:
   1. As stipulated in the Contract Documents, the Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.
   2. As the furnishing of such bonds is stipulated in the Contract Documents, the cost shall be included in the Proposal. If the furnishing of such bonds is required after receipt of proposals and before execution of the Contract, the cost of such bonds shall be added to the Proposal in determining the Contract Sum.
   3. The Proposer shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.
   4. Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

B. Time of Delivery and Form of Bonds
   1. The Proposer shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract.
   2. Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.
   3. The bonds shall be dated on or after the date of the Contract.
   4. The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.
   5. bond a certified and current copy of the power of attorney.

3.18 EXECUTION OF AGREEMENT

A. Notice of Award will be accompanied by required number of unsigned copies of the Agreement with other written Contract Documents attached.

B. Roofing Contractor (RC) is required to sign and deliver the required number of copies of the Agreement and attached documents to Owner with the required contract security.

C. Within 15 days thereafter Owner will deliver one fully signed copy to the Roofing Contractor (RC).

D. The Conditions of the Contract set forth the Owner's requirements as to performance and payment bonds or other contract security. When the successful proposer delivers the executed Agreement to Owner, it must be accompanied by the required contract security.

END OF SECTION

SECTION 01 10 70
INSTRUCTIONS TO PROPOSERS
PLAYGROUND EQUIPMENT

PART 1 COMPETITION PROCESS

1.1 PROJECT SCHEDULE

A. See Section 01 32 00 – Construction Schedules, Phasing & Site Logistics.

B. Attendance at pre-proposal briefings and site tours is mandatory.

1.2 REQUEST FOR QUALIFICATIONS

A. The Request for Qualifications documents consist of:
   1. The Request for Qualifications.
   2. The Instructions to Proposers.
   3. The Summary Project Description, including:
      a. Site Description.
      b. Program Narrative.
      c. Building Area Summary.
      d. Preliminary Project Budget.
      e. Summary of Agreement and Contract terms.

B. Qualifications Statement Submission: Date as indicated in schedule above.
   1. Location: Email to Joshua Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 Digital Copy

C. Acceptance and Rejection: Owner reserves the right to pre-qualify or reject proposers as unqualified, including without limitation the right to reject nonconforming, nonresponsive, unbalanced, or conditional qualifications. Owner reserves the right to reject the qualifications of any proposer if Owner believes that it would not be in the best interest of the project to make an award to that proposer, whether because the proposer is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

1.3 REQUEST FOR PROPOSALS

A. Qualified Proposers: Only those proposers already pre-qualified may receive the Proposal Documents or submit proposals. The individuals or entities that will be providing design professional services must be the same as those listed in the previously accepted qualifications.

B. The RFP Documents will consist of:
   1. The Request for Proposal, including:
      a. Project Information.
      b. The Instructions to Proposers.
      c. The Proposal Form.
      d. The Agreement and Conditions of the Contract and Contract Definitions.
      e. Sample contract forms.
   2. The Contract Documents, including:
      a. The Drawings.
      b. The Specifications.

C. Pre-Proposal Briefing(s): Date: January 13, 2023 at 3:30PM.
   1. Location: Homer CSD – HTEC Building (HS bus garage building)
   2. Only prospective proposers of record will be allowed to attend.

D. Proposal Submission: by January 27th at 4PM.
   1. Location: Email Proposal to Josh Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 digital copy via email
      a. 1 hard copy with company seal mailed for record to:
      Homer Central School District
      Attn: Michael Falls - Assistant Superintendent for Management
      PO Box 500
      Homer, New York 13077

E. Proposal Security: Each proposal must be accompanied by proposal security as described in Section 00 51 00 – Performance Bond and Labor and Material Payment Bond (AIA Document A312).

F. Proposals will be opened privately.

G. Acceptance, Award, And Rejection: All proposals will remain subject to acceptance for the time period indicated in Section 00 52 14 – Standard Form of Agreement & Insurance (AIA Document A132), but Owner may, at its sole discretion, release any proposal prior to that date.

H. Execution Of Agreement: When the Owner gives a Notice of Award to the successful proposer, the proposer will be expected to execute the Agreement within 15 days thereafter and deliver the required contract security.

PART 2 EVALUATION

2.1 THE EVALUATORS

A. Evaluation and recommendation will be made by the Owner, and the Owner's project team.

B. Owner may conduct such other investigations as Owner deems necessary to assist in the evaluation of any proposal and to establish the responsibility, qualifications, and financial ability of proposers, proposed design professionals, subcontractors, suppliers, and other individuals and entities to perform the work in accordance with Contract Documents.

2.2 SELECTION CRITERIA

A. Basis of Selection: The successful proposal will be the one that provides the best value to the Owner, based on the price after correction for greater or lesser quality and/or shorter or longer time ("adjusted low bid"), with Contract Amount based on Proposal price, as well as exceptional qualifications.

B. Proposal Exhibits: Submit drawings, specifications, and other data as indicated on the Proposal Form of form and character sufficient to adequately explain the design intent and the character of the proposed construction; incorporate into the exhibits substantiation specified in the Performance Specifications as to be submitted for the Proposal.

C. Qualifications Criteria: To demonstrate qualifications to perform the work, each proposer must submit written evidence, as called for below.
   1. The individuals or entities that will be providing design professional services must be listed in the Proposal.
   2. See Conditions of the Contract for contract conditions that may affect personnel provided.

PART 3 TERMS AND PROCEDURES

3.1 COPIES OF DOCUMENTS

A. Complete sets of Proposal Documents must be used in preparing proposals. Neither the

Owner nor any consultant of the Owner who might have been involved in the preparation of the Proposal Documents assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

B. Proposal Documents will not be issued directly to Sub-proposers unless specifically indicated.

C. The Owner makes copies of the Proposal Documents available on the above terms only for the purpose of obtaining proposals for the work and does not confer any license or grant for any other use.

3.2 QUESTIONS

A. All questions prior to proposal must be received by the close of business on January 13, 2023. Questions shall be directed to Josh Bezio at HUNT Engineers, Architects, Surveyors at email bezioj@hunt-eas.com Copy all RFI's to Lee Stepp at LeChase at email lee.stepp@lechase.com. All proposers request for information shall use the form located in specification 00 85 20 – Project Forms & Documents. A digital copy of this form is available upon request.

B. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda faxed or emailed to parties recorded by Owner as having received the Proposal Documents.

C. Proposers may arrange for courier delivery at their own expense.

D. Only questions answered by formal written Addenda will be binding; oral and other interpretations or clarifications will be without legal effect.

E. Addenda may also be issued to modify the Proposal Documents as deemed advisable by the Owner.

3.3 BRIEFINGS

A. Representatives of the Owner will be present to discuss the project.

B. Owner will transmit to prospective proposers of record such Addenda as Owner considers necessary in response to questions arising at the conference.

C. Oral statements made at briefings may not be relied upon and will not be binding or legally effective.

3.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A. It is the responsibility of each proposer, before submitting a proposal, to:

B. Examine the Proposal and Contract Documents thoroughly.

C. Visit the site to become familiar with and satisfy the proposer as to the general, local, and site conditions that may affect cost, progress, or performance of the work.

D. Consider federal, state, and local laws and regulations that may affect cost, progress, and performance of the work.

E. Study and carefully correlate the proposer's knowledge and observations with the Proposal Documents and other related data.

F. Promptly notify the Owner of conflicts, errors, ambiguities, and discrepancies which the proposer has discovered in the Proposal Documents.

3.5 INFORMATION RELATING TO EXISTING CONDITIONS

A. The Owner has identified certain reports and/or tests, which have been utilized by the Owner in preparation of the Proposal Documents.

B. The proposer may rely on the general accuracy of the technical data contained in such reports but not upon other data, interpretations, or opinions contained in such reports, not upon the completeness thereof for the purposes of preparing its proposal, for design, or for construction.

C. Where such reports are not included in the Proposal Documents, copies will be made available by Owner to any proposer on written request.

D. These reports are not part of Contract Documents; the proposer is responsible for any interpretation or conclusion drawn from such reports.

3.6 SUPPLEMENTARY INVESTIGATIONS

A. Before submitting a proposal each proposer will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, or data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise, which may affect cost, progress, or performance of the work, or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by the proposer and safety precautions and programs incident thereto, or which the proposer deems necessary to prepare its proposal for performing the work in accordance with the time, price, and other terms and conditions of Contract Documents.

3.7 WORK AT SITE BY OTHERS

A. See Section 01 10 00 – General Summary of Work and Sections 01 10 10 – General Summary of Work, 01 10 20 – General Construction (GC), 01 10 30 – Plumbing (PC), 01 10 40 – Mechanical (MC / HVAC), 01 10 50 – Site Work (SC) for identification of the general nature of work that is to be performed at the site by Owner or others (such as utility companies & Prime Contractors) that relates to the work for which a proposal is to be submitted.

B. On request, Owner will provide the proposer access to or copies of Contract Documents for such work (other than portions thereof related to price).

3.8 TAXES

A. Owner is exempt from State sales and use taxes on materials and equipment to be incorporated into the work.

B. Do not include said taxes in the Contract Price.

C. See Conditions of the Contract for additional information.

3.9 CONTRACT TIME

A. The time within which the work is to be completed will be incorporated into the Agreement.

B. The apparent successful proposer will be required to satisfy Owner that it will be able to achieve Substantial Completion and final completion within the designated times.

3.10 QUALIFICATION STATEMENT

A. Contractor's Qualification Statement:
   1. Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for the Proposal.
   2. A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

B. Materials larger than 8-1/2 by 11 inches will not be accepted.

C. References: Maximum of 20, verified, with contact name, phone number, and fax number; notify contact person that Owner may request information.

D. Resumes: Maximum of 10 persons; maximum of 2 pages each.

E. Slides: Submit in plastic slide holders punched for 3-ring binder, for viewing without removal from holder.

F. Standard printed brochures are preferable to custom-prepared graphics.

3.11 PROPOSAL FORM

A. Proposal Form: The Proposal Form is included in the Proposal Documents; additional copies may be obtained from the Owner.

B. Fill in blanks on the Proposal Form electronically.
   1. In addition to signatures, enter names electronically.
   2. Show address, telephone number, fax number, and email address for communications regarding the proposal.
   3. Sums shall be expressed in both words and numbers. In case of discrepancy, the amount entered in words shall govern.
   4. All requested Alternates shall be proposed. If no change in the Base Proposal, enter "No Change" in the proposal form.

C. Execute Proposals by partnerships in the partnership name; signed by a partner, whose title must appear under the signature.
   1. Show the official address of the partnership below the signature.

D. Execute Proposals by corporations in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign); affix corporate seal and indicate it has been attested by the secretary or an assistant secretary.
   1. Show corporate address and state of incorporation below the signature.
   2. Attach evidence of authority to conduct business in the state where the work is to be performed If the proposer is an out-of-state corporation.

E. Include an acknowledgement of receipt of issued Addenda on the Proposal Form, including their numbers and dates.

3.12 PROPOSAL EXHIBITS

A. Materials submitted will become the property of the Owner.

B. Owner reserves the right to publish or display publicly submitted exhibits.

3.13 PROPOSAL SUBMISSION

A. Enclose Proposals in an opaque sealed envelope or box, marked with the project title and the designated portion of the project for which it is submitted and the name and address of the proposer.

B. Seal the price proposal in a separate envelope marked "PLAYGROUND EQUIPMENT PRICE PROPOSAL."

C. If the submission is sent through the mail or other delivery system, enclose the sealed envelope or box in a separate envelope or container marked "QUALIFICATIONS ENCLOSED" or "PLAYGROUND EQUIPMENT PROPOSAL ENCLOSED" (as applicable).

D. Include Exhibits indicated on the Proposal Form in the same envelope or box; clearly identify each separate item with the proposer's name and project name.

3.14 PROPOSAL SECURITY

A. Proposal security must be in the form of a certified or cashier's check.

B. The proposal security of the successful proposer will be retained until such proposer has executed the Agreement, furnished any required contract security, and met the other conditions of the Notice of Award, whereupon the proposal security will be returned.

C. If the successful proposer fails to execute and deliver the Agreement and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the proposal security of that proposer will be forfeited.

D. The proposal security of proposers whose proposal is not considered competitive will be returned within 7 days after the proposal opening.

3.15 DISQUALIFICATION

A. Any proposer may be disqualified due to breach of proposal procedures, modification of proposal after submission, or withdrawal of proposal after submission.

B. Disqualification will result in forfeiture of proposal security.

3.16 SUBMITTALS

A. After notification of selection for the award of the Contract, the Proposer shall, as soon as practicable or as stipulated in the Contract Documents, submit in writing to the Owner through the Construction Manager & Architect via Procore & Newforma:
   1. a designation of the Work to be performed with the Proposer's own forces;
   2. names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
   3. names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
   4. a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 29 00 – Payment Procedures.

B. The Proposer will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Contract Documents.

C. Prior to the execution of the Contract, the Architect will notify the Proposer if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may, at the Proposer's option, withdraw the Proposal or submit an acceptable substitute person or entity. The Proposer may also submit any required adjustment in the Base Proposal or Alternate Proposal to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted proposal price or disqualify the Proposer.

D. Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

3.17 PERFORMANCE BOND AND PAYMENT BOND

A. Bond Requirements:
   1. As stipulated in the Contract Documents, the Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

2. As the furnishing of such bonds is stipulated in the Contract Documents, the cost shall be included in the Proposal. If the furnishing of such bonds is required after receipt of proposals and before execution of the Contract, the cost of such bonds shall be added to the Proposal in determining the Contract Sum.
3. The Proposer shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.
4. Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

B. Time of Delivery and Form of Bonds
1. The Proposer shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract.
2. Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.
3. The bonds shall be dated on or after the date of the Contract.
4. The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.
5. bond a certified and current copy of the power of attorney.

3.18 EXECUTION OF AGREEMENT

A. Notice of Award will be accompanied by required number of unsigned copies of the Agreement with other written Contract Documents attached.

B. Playground Equipment Contractor is required to sign and deliver the required number of copies of the Agreement and attached documents to Owner with the required contract security.

C. Within 15 days thereafter Owner will deliver one fully signed copy to the Playground Equipment Contractor.

D. The Conditions of the Contract set forth the Owner's requirements as to performance and payment bonds or other contract security. When the successful proposer delivers the executed Agreement to Owner, it must be accompanied by the required contract security.

END OF SECTION

SECTION 01 10 80
INSTRUCTIONS TO PROPOSERS
HVAC CONTORLS & PROGRAMMING

PART 1 COMPETITION PROCESS

1.1 PROJECT SCHEDULE

A. See Section 01 32 00 – Construction Schedules, Phasing & Site Logistics.

B. Attendance at pre-proposal briefings and site tours is mandatory.

1.2 REQUEST FOR QUALIFICATIONS

A. The Request for Qualifications documents consist of:
   1. The Request for Qualifications.
   2. The Instructions to Proposers.
   3. The Summary Project Description, including:
      a. Site Description.
      b. Program Narrative.
      c. Building Area Summary.
      d. Preliminary Project Budget.
      e. Summary of Agreement and Contract terms.

B. Qualifications Statement Submission: Date as indicated in schedule above.
   1. Location: Email to Joshua Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 Digital Copy

C. Acceptance and Rejection: Owner reserves the right to pre-qualify or reject proposers as unqualified, including without limitation the right to reject nonconforming, nonresponsive, unbalanced, or conditional qualifications. Owner reserves the right to reject the qualifications of any proposer if Owner believes that it would not be in the best interest of the project to make an award to that proposer, whether because the proposer is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

1.3 REQUEST FOR PROPOSALS

A. Qualified Proposers: Only those proposers already pre-qualified may receive the Proposal Documents or submit proposals. The individuals or entities that will be providing design professional services must be the same as those listed in the previously accepted qualifications.

B. The RFP Documents will consist of:
   1. The Request for Proposal, including:
      a. Project Information.
      b. The Instructions to Proposers.
      c. The Proposal Form.
      d. The Agreement and Conditions of the Contract and Contract Definitions.
      e. Sample contract forms.
   2. The Contract Documents, including:
      a. The Drawings.
      b. The Specifications.

C. Pre-Proposal Briefing(s): Coordinate with Construction Manager for site visits at lee.stepp@lechase.com

D. Proposal Submission: by January 20th at 4PM.
   1. Location: Email Proposal to Josh Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 digital copy via email
      a. 1 hard copy with company seal mailed for record to:
      Homer Central School District
      Attn: Michael Falls - Assistant Superintendent for Management
      PO Box 500
      Homer, New York 13077

E. Proposal Security: Each proposal must be accompanied by proposal security as described in Section 00 51 00 – Performance Bond and Labor and Material Payment Bond (AIA Document A312).

F. Proposals will be opened privately.

G. Acceptance, Award, And Rejection: All proposals will remain subject to acceptance for the time period indicated in Section 00 52 14 – Standard Form of Agreement & Insurance (AIA Document A132), but Owner may, at its sole discretion, release any proposal prior to that date.

H. Execution Of Agreement: When the Owner gives a Notice of Award to the successful proposer, the proposer will be expected to execute the Agreement within 15 days thereafter and deliver the required contract security.

PART 2 EVALUATION

2.1 THE EVALUATORS

A. Evaluation and recommendation will be made by the Owner, and the Owner's project team.

B. Owner may conduct such other investigations as Owner deems necessary to assist in the evaluation of any proposal and to establish the responsibility, qualifications, and financial ability of proposers, proposed design professionals, subcontractors, suppliers, and other individuals and entities to perform the work in accordance with Contract Documents.

2.2 SELECTION CRITERIA

A. Basis of Selection: The successful proposal will be the one that provides the best value to the Owner, based on the price after correction for greater or lesser quality and/or shorter or longer time ("adjusted low bid"), with Contract Amount based on Proposal price, as well as exceptional qualifications.

B. Proposal Exhibits: Submit drawings, specifications, and other data as indicated on the Proposal Form of form and character sufficient to adequately explain the design intent and the character of the proposed construction; incorporate into the exhibits substantiation specified in the Performance Specifications as to be submitted for the Proposal.

C. Qualifications Criteria: To demonstrate qualifications to perform the work, each proposer must submit written evidence, as called for below.
   1. The individuals or entities that will be providing design professional services must be listed in the Proposal.
   2. See Conditions of the Contract for contract conditions that may affect personnel provided.

PART 3 TERMS AND PROCEDURES

3.1 COPIES OF DOCUMENTS

A. Complete sets of Proposal Documents must be used in preparing proposals. Neither the

Owner nor any consultant of the Owner who might have been involved in the preparation of the Proposal Documents assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

B. Proposal Documents will not be issued directly to Sub-proposers unless specifically indicated.

C. The Owner makes copies of the Proposal Documents available on the above terms only for the purpose of obtaining proposals for the work and does not confer any license or grant for any other use.

3.2 QUESTIONS

A. All questions prior to proposal must be received by the close of business on January 13, 2023. Questions shall be directed to Josh Bezio at HUNT Engineers, Architects, Surveyors at email bezioj@hunt-eas.com Copy all RFI's to Lee Stepp at LeChase at email lee.stepp@lechase.com. All proposers request for information shall use the form located in specification 00 85 20 – Project Forms & Documents. A digital copy of this form is available upon request.

B. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda faxed or emailed to parties recorded by Owner as having received the Proposal Documents.

C. Proposers may arrange for courier delivery at their own expense.

D. Only questions answered by formal written Addenda will be binding; oral and other interpretations or clarifications will be without legal effect.

E. Addenda may also be issued to modify the Proposal Documents as deemed advisable by the Owner.

3.3 BRIEFINGS

A. Representatives of the Owner will be present to discuss the project.

B. Owner will transmit to prospective proposers of record such Addenda as Owner considers necessary in response to questions arising at the conference.

C. Oral statements made at briefings may not be relied upon and will not be binding or legally effective.

3.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A. It is the responsibility of each proposer, before submitting a proposal, to:

B. Examine the Proposal and Contract Documents thoroughly.

C. Visit the site to become familiar with and satisfy the proposer as to the general, local, and site conditions that may affect cost, progress, or performance of the work.

D. Consider federal, state, and local laws and regulations that may affect cost, progress, and performance of the work.

E. Study and carefully correlate the proposer's knowledge and observations with the Proposal Documents and other related data.

F. Promptly notify the Owner of conflicts, errors, ambiguities, and discrepancies which the proposer has discovered in the Proposal Documents.

3.5 INFORMATION RELATING TO EXISTING CONDITIONS

A. The Owner has identified certain reports and/or tests, which have been utilized by the Owner in preparation of the Proposal Documents.

B. The proposer may rely on the general accuracy of the technical data contained in such reports but not upon other data, interpretations, or opinions contained in such reports, not upon the completeness thereof for the purposes of preparing its proposal, for design, or for construction.

C. Where such reports are not included in the Proposal Documents, copies will be made available by Owner to any proposer on written request.

D. These reports are not part of Contract Documents; the proposer is responsible for any interpretation or conclusion drawn from such reports.

3.6 SUPPLEMENTARY INVESTIGATIONS

A. Before submitting a proposal each proposer will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, or data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise, which may affect cost, progress, or performance of the work, or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by the proposer and safety precautions and programs incident thereto, or which the proposer deems necessary to prepare its proposal for performing the work in accordance with the time, price, and other terms and conditions of Contract Documents.

3.7 WORK AT SITE BY OTHERS

A. See Section 01 10 00 – General Summary of Work and Sections 01 10 10 – General Summary of Work, 01 10 20 – General Construction (GC), 01 10 30 – Plumbing (PC), 01 10 40 – Mechanical (MC / HVAC), 01 10 50 – Site Work (SC) for identification of the general nature of work that is to be performed at the site by Owner or others (such as utility companies & Prime Contractors) that relates to the work for which a proposal is to be submitted.

B. On request, Owner will provide the proposer access to or copies of Contract Documents for such work (other than portions thereof related to price).

3.8 TAXES

A. Owner is exempt from State sales and use taxes on materials and equipment to be incorporated into the work.

B. Do not include said taxes in the Contract Price.

C. See Conditions of the Contract for additional information.

3.9 CONTRACT TIME

A. The time within which the work is to be completed will be incorporated into the Agreement.

B. The apparent successful proposer will be required to satisfy Owner that it will be able to achieve Substantial Completion and final completion within the designated times.

3.10 QUALIFICATION STATEMENT

A. Contractor's Qualification Statement:
   1. Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for the Proposal.
   2. A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

B. Materials larger than 8-1/2 by 11 inches will not be accepted.

C. References: Maximum of 20, verified, with contact name, phone number, and fax number; notify contact person that Owner may request information.

D. Resumes: Maximum of 10 persons; maximum of 2 pages each.

E. Slides: Submit in plastic slide holders punched for 3-ring binder, for viewing without removal from holder.

F. Standard printed brochures are preferable to custom-prepared graphics.

3.11 PROPOSAL FORM

A. Proposal Form: The Proposal Form is included in the Proposal Documents; additional copies may be obtained from the Owner.

B. Fill in blanks on the Proposal Form electronically.
1. In addition to signatures, enter names electronically.
2. Show address, telephone number, fax number, and email address for communications regarding the proposal.
3. Sums shall be expressed in both words and numbers. In case of discrepancy, the amount entered in words shall govern.
4. All requested Alternates shall be proposed. If no change in the Base Proposal, enter "No Change" in the proposal form.

C. Execute Proposals by partnerships in the partnership name; signed by a partner, whose title must appear under the signature.
1. Show the official address of the partnership below the signature.

D. Execute Proposals by corporations in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign); affix corporate seal and indicate it has been attested by the secretary or an assistant secretary.
1. Show corporate address and state of incorporation below the signature.
2. Attach evidence of authority to conduct business in the state where the work is to be performed If the proposer is an out-of-state corporation.

E. Include an acknowledgement of receipt of issued Addenda on the Proposal Form, including their numbers and dates.

3.12 PROPOSAL EXHIBITS

A. Materials submitted will become the property of the Owner.

B. Owner reserves the right to publish or display publicly submitted exhibits.

3.13 PROPOSAL SUBMISSION

A. Enclose Proposals in an opaque sealed envelope or box, marked with the project title and the designated portion of the project for which it is submitted and the name and address of the proposer.

B. Seal the price proposal in a separate envelope marked "HVAC CONTROLS & PROGRAMMING PRICE PROPOSAL."

C. If the submission is sent through the mail or other delivery system, enclose the sealed envelope or box in a separate envelope or container marked "QUALIFICATIONS ENCLOSED" or "HVAC CONTROLS & PROGRAMMING PROPOSAL ENCLOSED" (as applicable).

D. Include Exhibits indicated on the Proposal Form in the same envelope or box; clearly identify each separate item with the proposer's name and project name.

3.14 PROPOSAL SECURITY

A. Proposal security must be in the form of a certified or cashier's check.

B. The proposal security of the successful proposer will be retained until such proposer has executed the Agreement, furnished any required contract security, and met the other conditions of the Notice of Award, whereupon the proposal security will be returned.

C. If the successful proposer fails to execute and deliver the Agreement and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the proposal security of that proposer will be forfeited.

D. The proposal security of proposers whose proposal is not considered competitive will be returned within 7 days after the proposal opening.

3.15 DISQUALIFICATION

A. Any proposer may be disqualified due to breach of proposal procedures, modification of proposal after submission, or withdrawal of proposal after submission.

B. Disqualification will result in forfeiture of proposal security.

3.16 SUBMITTALS

A. After notification of selection for the award of the Contract, the Proposer shall, as soon as practicable or as stipulated in the Contract Documents, submit in writing to the Owner through the Construction Manager & Architect via Procore & Newforma:
   1. a designation of the Work to be performed with the Proposer's own forces;
   2. names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
   3. names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
   4. a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 29 00 – Payment Procedures.

B. The Proposer will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Contract Documents.

C. Prior to the execution of the Contract, the Architect will notify the Proposer if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may, at the Proposer's option, withdraw the Proposal or submit an acceptable substitute person or entity. The Proposer may also submit any required adjustment in the Base Proposal or Alternate Proposal to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted proposal price or disqualify the Proposer.

D. Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

3.17 PERFORMANCE BOND AND PAYMENT BOND

A. Bond Requirements:
   1. As stipulated in the Contract Documents, the Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

2. As the furnishing of such bonds is stipulated in the Contract Documents, the cost shall be included in the Proposal. If the furnishing of such bonds is required after receipt of proposals and before execution of the Contract, the cost of such bonds shall be added to the Proposal in determining the Contract Sum.
3. The Proposer shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.
4. Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

B. Time of Delivery and Form of Bonds
1. The Proposer shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract.
2. Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.
3. The bonds shall be dated on or after the date of the Contract.
4. The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.
5. bond a certified and current copy of the power of attorney.

3.18 EXECUTION OF AGREEMENT

A. Notice of Award will be accompanied by required number of unsigned copies of the Agreement with other written Contract Documents attached.

B. HVAC EQUIPMENT AND PROGRAMMING Contractor is required to sign and deliver the required number of copies of the Agreement and attached documents to Owner with the required contract security.

C. Within 15 days thereafter Owner will deliver one fully signed copy to the HVAC EQUIPMENT AND PROGRAMMING Contractor.

D. The Conditions of the Contract set forth the Owner's requirements as to performance and payment bonds or other contract security. When the successful proposer delivers the executed Agreement to Owner, it must be accompanied by the required contract security.

END OF SECTION

SECTION 01 10 90
INSTRUCTIONS TO PROPOSERS
HS PRESSBOX

PART 1 COMPETITION PROCESS

1.1 PROJECT SCHEDULE

A. See Section 01 32 00 – Construction Schedules, Phasing & Site Logistics.

B. Attendance at pre-proposal briefings and site tours is mandatory.

1.2 REQUEST FOR QUALIFICATIONS

A. The Request for Qualifications documents consist of:
   1. The Request for Qualifications.
   2. The Instructions to Proposers.
   3. The Summary Project Description, including:
      a. Site Description.
      b. Program Narrative.
      c. Building Area Summary.
      d. Preliminary Project Budget.
      e. Summary of Agreement and Contract terms.

B. Qualifications Statement Submission: Date as indicated in schedule above.
   1. Location: Email to Joshua Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 Digital Copy

C. Acceptance and Rejection: Owner reserves the right to pre-qualify or reject proposers as unqualified, including without limitation the right to reject nonconforming, nonresponsive, unbalanced, or conditional qualifications. Owner reserves the right to reject the qualifications of any proposer if Owner believes that it would not be in the best interest of the project to make an award to that proposer, whether because the proposer is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

1.3 REQUEST FOR PROPOSALS

A. Qualified Proposers: Only those proposers already pre-qualified may receive the Proposal Documents or submit proposals. The individuals or entities that will be providing design professional services must be the same as those listed in the previously accepted qualifications.

B. The RFP Documents will consist of:
   1. The Request for Proposal, including:
      a. Project Information.
      b. The Instructions to Proposers.
      c. The Proposal Form.
      d. The Agreement and Conditions of the Contract and Contract Definitions.
      e. Sample contract forms.
   2. The Contract Documents, including:
      a. The Drawings.
      b. The Specifications.

C. Pre-Proposal Briefing(s): Date: Coordinate with Construction Manager for site visits at lee.stepp@lechase.com

D. Proposal Submission: by January 27th at 4PM.
   1. Location: Email Proposal to Josh Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 digital copy via email
      a. 1 hard copy with company seal mailed for record to:
      Homer Central School District
      Attn: Michael Falls - Assistant Superintendent for Management
      PO Box 500
      Homer, New York 13077

E. Proposal Security: Each proposal must be accompanied by proposal security as described in Section 00 51 00 – Performance Bond and Labor and Material Payment Bond (AIA Document A312).

F. Proposals will be opened privately.

G. Acceptance, Award, And Rejection: All proposals will remain subject to acceptance for the time period indicated in Section 00 52 14 – Standard Form of Agreement & Insurance (AIA Document A132), but Owner may, at its sole discretion, release any proposal prior to that date.

H. Execution Of Agreement: When the Owner gives a Notice of Award to the successful proposer, the proposer will be expected to execute the Agreement within 15 days thereafter and deliver the required contract security.

1.4 The HS Press box Contractor shall be responsible for all HS Press box work shown on the Landscape (L), Architectural (A) Drawings, unless noted otherwise, and any HS Press box work shown on all other drawings and further defined below:

A. Division 13 34 23

1. Specification Section 13 34 23 – Fabricated Press Box

   a. Provide all components and accessories, foundations, and specifications including installation.

   b. Electrical and data connections by Electrical Contract.

   c. Site Work Contractor will provide trenching, excavation, backfill and site restoration for HS Press box and associated utilities.

2. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all Digital Site Signage Work in accordance with Contract Documents and all applicable codes having jurisdiction.

3. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

PART 2 EVALUATION

2.1 THE EVALUATORS

A. Evaluation and recommendation will be made by the Owner, and the Owner's project team.

B. Owner may conduct such other investigations as Owner deems necessary to assist in the evaluation of any proposal and to establish the responsibility, qualifications, and financial ability of proposers, proposed design professionals, subcontractors, suppliers, and other individuals and entities to perform the work in accordance with Contract Documents.

2.2 SELECTION CRITERIA

A. Basis of Selection: The successful proposal will be the one that provides the best value to the Owner, based on the price after correction for greater or lesser quality and/or shorter or longer time ("adjusted low bid"), with Contract Amount based on Proposal price, as well as exceptional qualifications.

B. Proposal Exhibits: Submit drawings, specifications, and other data as indicated on the Proposal Form of form and character sufficient to adequately explain the design intent and the character of the proposed construction; incorporate into the exhibits substantiation specified in the Performance Specifications as to be submitted for the Proposal.

C. Qualifications Criteria: To demonstrate qualifications to perform the work, each proposer must submit written evidence, as called for below.
   1. The individuals or entities that will be providing design professional services must be listed in the Proposal.
   2. See Conditions of the Contract for contract conditions that may affect personnel provided.

PART 3 TERMS AND PROCEDURES

3.1 COPIES OF DOCUMENTS

A. Complete sets of Proposal Documents must be used in preparing proposals. Neither the Owner nor any consultant of the Owner who might have been involved in the preparation of the Proposal Documents assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

B. Proposal Documents will not be issued directly to Sub-proposers unless specifically indicated.

C. The Owner makes copies of the Proposal Documents available on the above terms only for the purpose of obtaining proposals for the work and does not confer any license or grant for any other use.

3.2 QUESTIONS

A. All questions prior to proposal must be received by the close of business on January 13, 2023. Questions shall be directed to Josh Bezio at HUNT Engineers, Architects, Surveyors at email bezioj@hunt-eas.com Copy all RFI's to Lee Stepp at LeChase at email lee.stepp@lechase.com. All proposers request for information shall use the form located in specification 00 85 20 – Project Forms & Documents. A digital copy of this form is available upon request.

B. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda faxed or emailed to parties recorded by Owner as having received the Proposal Documents.

C. Proposers may arrange for courier delivery at their own expense.

D. Only questions answered by formal written Addenda will be binding; oral and other interpretations or clarifications will be without legal effect.

E. Addenda may also be issued to modify the Proposal Documents as deemed advisable by the Owner.

3.3 BRIEFINGS

A. Representatives of the Owner will be present to discuss the project.

B. Owner will transmit to prospective proposers of record such Addenda as Owner considers necessary in response to questions arising at the conference.

C. Oral statements made at briefings may not be relied upon and will not be binding or legally effective.

3.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A. It is the responsibility of each proposer, before submitting a proposal, to:

B. Examine the Proposal and Contract Documents thoroughly.

C. Visit the site to become familiar with and satisfy the proposer as to the general, local, and site conditions that may affect cost, progress, or performance of the work.

D. Consider federal, state, and local laws and regulations that may affect cost, progress, and performance of the work.

E. Study and carefully correlate the proposer's knowledge and observations with the Proposal Documents and other related data.

F. Promptly notify the Owner of conflicts, errors, ambiguities, and discrepancies which the proposer has discovered in the Proposal Documents.

3.5 INFORMATION RELATING TO EXISTING CONDITIONS

A. The Owner has identified certain reports and/or tests, which have been utilized by the Owner in preparation of the Proposal Documents.

B. The proposer may rely on the general accuracy of the technical data contained in such reports but not upon other data, interpretations, or opinions contained in such reports, not upon the completeness thereof for the purposes of preparing its proposal, for design, or for construction.

C. Where such reports are not included in the Proposal Documents, copies will be made available by Owner to any proposer on written request.

D. These reports are not part of Contract Documents; the proposer is responsible for any interpretation or conclusion drawn from such reports.

3.6 SUPPLEMENTARY INVESTIGATIONS

A. Before submitting a proposal each proposer will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, or data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise, which may affect cost, progress, or performance of the work, or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by the proposer and safety precautions and programs incident thereto, or which the proposer deems necessary to prepare its proposal for performing the work in accordance with the time, price, and other terms and conditions of Contract Documents.

3.7 WORK AT SITE BY OTHERS

A. See Section 01 10 00 – General Summary of Work and Sections 01 10 10 – General Summary of Work, 01 10 20 – General Construction (GC), 01 10 30 – Plumbing (PC), 01 10 40 – Mechanical (MC / HVAC), 01 10 50 – Site Work (SC) for identification of the general nature of work that is to be performed at the site by Owner or others (such as utility companies & Prime Contractors) that relates to the work for which a proposal is to be submitted.

B. On request, Owner will provide the proposer access to or copies of Contract Documents for such work (other than portions thereof related to price).

3.8 TAXES

A. Owner is exempt from State sales and use taxes on materials and equipment to be incorporated into the work.

B. Do not include said taxes in the Contract Price.

C. See Conditions of the Contract for additional information.

3.9 CONTRACT TIME

A. The time within which the work is to be completed will be incorporated into the Agreement.

B. The apparent successful proposer will be required to satisfy Owner that it will be able to achieve Substantial Completion and final completion within the designated times.

3.10 QUALIFICATION STATEMENT

A. Contractor's Qualification Statement:
   1. Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for the Proposal.
   2. A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

B. Materials larger than 8-1/2 by 11 inches will not be accepted.

C. References: Maximum of 20, verified, with contact name, phone number, and fax number; notify contact person that Owner may request information.

D. Resumes: Maximum of 10 persons; maximum of 2 pages each.

E. Slides: Submit in plastic slide holders punched for 3-ring binder, for viewing without removal from holder.

F. Standard printed brochures are preferable to custom-prepared graphics.

3.11 PROPOSAL FORM

A. Proposal Form: The Proposal Form is included in the Proposal Documents; additional copies may be obtained from the Owner.

B. Fill in blanks on the Proposal Form electronically.
   1. In addition to signatures, enter names electronically.
   2. Show address, telephone number, fax number, and email address for communications regarding the proposal.
   3. Sums shall be expressed in both words and numbers. In case of discrepancy, the amount entered in words shall govern.
   4. All requested Alternates shall be proposed. If no change in the Base Proposal, enter "No Change" in the proposal form.

C. Execute Proposals by partnerships in the partnership name; signed by a partner, whose title must appear under the signature.
   1. Show the official address of the partnership below the signature.

D. Execute Proposals by corporations in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign); affix corporate seal and indicate it has been attested by the secretary or an assistant secretary.
   1. Show corporate address and state of incorporation below the signature.
   2. Attach evidence of authority to conduct business in the state where the work is to be performed If the proposer is an out-of-state corporation.

E. Include an acknowledgement of receipt of issued Addenda on the Proposal Form, including their numbers and dates.

3.12 PROPOSAL EXHIBITS

A. Materials submitted will become the property of the Owner.

B. Owner reserves the right to publish or display publicly submitted exhibits.

3.13 PROPOSAL SUBMISSION

A. Enclose Proposals in an opaque sealed envelope or box, marked with the project title and the designated portion of the project for which it is submitted and the name and address of the proposer.

B. Seal the price proposal in a separate envelope marked "HS PRESSBOX PRICE PROPOSAL."

C. If the submission is sent through the mail or other delivery system, enclose the sealed envelope or box in a separate envelope or container marked "QUALIFICATIONS ENCLOSED" or "HS PRESSBOX PROPOSAL ENCLOSED" (as applicable).

D. Include Exhibits indicated on the Proposal Form in the same envelope or box; clearly identify each separate item with the proposer's name and project name.

3.14 PROPOSAL SECURITY

A. Proposal security must be in the form of a certified or cashier's check.

B. The proposal security of the successful proposer will be retained until such proposer has executed the Agreement, furnished any required contract security, and met the other conditions of the Notice of Award, whereupon the proposal security will be returned.

C. If the successful proposer fails to execute and deliver the Agreement and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the proposal security of that proposer will be forfeited.

D. The proposal security of proposers whose proposal is not considered competitive will be returned within 7 days after the proposal opening.

3.15 DISQUALIFICATION

A. Any proposer may be disqualified due to breach of proposal procedures, modification of proposal after submission, or withdrawal of proposal after submission.

B. Disqualification will result in forfeiture of proposal security.

3.16 SUBMITTALS

A. After notification of selection for the award of the Contract, the Proposer shall, as soon as practicable or as stipulated in the Contract Documents, submit in writing to the Owner through the Construction Manager & Architect via Procore & Newforma:
   1. a designation of the Work to be performed with the Proposer’s own forces;
   2. names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
   3. names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
   4. a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 29 00 – Payment Procedures.

B. The Proposer will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Contract Documents.

C. Prior to the execution of the Contract, the Architect will notify the Proposer if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may, at the Proposer’s option, withdraw the Proposal or submit an acceptable substitute person or entity. The Proposer may also submit any required adjustment in the Base Proposal or Alternate Proposal to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted proposal price or disqualify the Proposer.

D. Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

3.17 PERFORMANCE BOND AND PAYMENT BOND

A. Bond Requirements:
   1. As stipulated in the Contract Documents, the Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

2. As the furnishing of such bonds is stipulated in the Contract Documents, the cost shall be included in the Proposal. If the furnishing of such bonds is required after receipt of proposals and before execution of the Contract, the cost of such bonds shall be added to the Proposal in determining the Contract Sum.
3. The Proposer shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.
4. Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

B. Time of Delivery and Form of Bonds
1. The Proposer shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract.
2. Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.
3. The bonds shall be dated on or after the date of the Contract.
4. The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.
5. bond a certified and current copy of the power of attorney.

3.18 EXECUTION OF AGREEMENT

A. Notice of Award will be accompanied by required number of unsigned copies of the Agreement with other written Contract Documents attached.

B. HS Pressbox Contractor is required to sign and deliver the required number of copies of the Agreement and attached documents to Owner with the required contract security.

C. Within 15 days thereafter Owner will deliver one fully signed copy to the Playground Equipment Contractor.

D. The Conditions of the Contract set forth the Owner's requirements as to performance and payment bonds or other contract security. When the successful proposer delivers the executed Agreement to Owner, it must be accompanied by the required contract security.

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Applications for payments.

C. Change procedures.

1.2 RELATED REQUIREMENTS

A. Section 00 52 14 - Standard Form of Agreement: Contract Sum, retainages, payment period, monetary values of unit prices.

B. Section 00 72 14 - General Conditions of the Contract for Construction: Additional requirements for progress payments, final payment, changes in the Work.

C. Section 01 21 00 - Allowances: Payment procedures relating to allowances.

D. Section 01 22 00 - Unit Prices: Monetary values of unit prices; Payment and modification procedures relating to unit prices.

E. Section 01 30 00 - Administrative Requirements: General submittal procedures.

F. Section 01 60 00 - Product Requirements: Substitution limitations and procedures.

G. Section 01 70 00 - Execution and Closeout Requirements: Project record documents.

1.3 SCHEDULE OF VALUES

A. Submit completed schedule on Form: AIA G703 - Continuation Sheet for G702.

B. Submit Schedule of Values electronically within 15 days after date of Owner-Contractor Agreement established in Notice to Proceed.

C. Include separately for each line item, the amount for materials, and the amount for labor

D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.
   1. Separate by SED numbers, listing SED number and Building name. When applicable, further separate each building by additionals and alterations, include a subtotal for each.

E. Provide 1% of contract value for execution of closeout documents.

F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

H. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Use Form AIA G732 and Form AIA G703, edition stipulated in the Agreement.

C. Content and Format: Use data from approved Schedule of Values for listing items in Application for Payment.

D. Submit electronically each Application for Payment.

E. Include the following with the application:
1. Transmittal letter as specified for submittals in Section 01 30 00.
2. Construction progress schedule, revised and current as specified in Section 01 32 16.

F. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include with Application for Payment:
1. Partial release of liens from major subcontractors and vendors.
2. Project record documents as specified in Section 01 78 00, for review by Owner which will be returned to the Contractor.
3. Affidavits attesting to off-site stored products.
4. Certified payrolls.
5. Updated project schedule and timelines.

1.5 CHANGE PROCEDURES

A. Change Order Forms: AIA G701 Change Order.

B. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.

C. For minor changes not involving an adjustment to the Contract Sum/Price or Contract Time, Architect will issue supplemental instructions on AIA Form G710 directly to Contractor.

D. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum/Price or Contract Time.
2. Promptly execute the change.

E. The Architect/Engineer may issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change. Contractor shall prepare and submit a estimated price quotation within 15 days.

F. Contractor may propose a change by submitting a request for change to Architect/Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.

G. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's price quotation.
2. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit prices. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in

Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

3. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
4. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
    a. Maintain daily detailed records of work completed on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work. Daily Time and Material tickets must be validated and signed by the Owner's Representative to be acceptable for issuance of the change order.

H. Substantiation of Costs: Provide full information for change in cost or time with sufficient data to allow evaluation of quotation..

I. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

J. Correlation of Contractor Submittals:
1. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.
2. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
3. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00
ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing Allowances.

1. Contingency Allowances as set forth in the Specifications are to be used for compensation in minor changes in the scope of the work for contingency allowances. Lump Sum Allowances as set forth in the Specifications are to be used for selected materials to defer the selection of actual materials and equipment to a later date when additional information is available for evaluation. The amounts listed in the schedule are to be included in the base bid.
2. Include in the Contract sum the Allowances stated in this section.
3. Allowance work shall be completed and invoiced only at the direction of the Construction Manager.
4. Separate line items for each Allowance will be reflected on the Contractors' Schedule of Values.

1.3 ALLOWANCES

A. Contingency Allowances shall be used only as directed for the Owner's purposes and only by Field Directives from the Construction Manger and Architect that indicate amounts to be charged to the Allowance.

B. The Contractor's related costs for products and equipment ordered by the Owner under the Contingency Allowance are part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Allowances shall cover the cost to the Contractor for labor, materials, equipment, coordination and all applicable taxes. Overhead and profit, including costs for bonds and insurance, are to be included in the base bid Contract sum. Therefore, the Contractor is not entitled to overhead and profit on work compensated for under an Allowance.

D. Allowance authorization documents will be issued authorizing the distribution of Allowance funds.

E. At project closeout, or at any time during the project, unused portions of the Allowance will be credited from the Contractors original base bid amount, by Change Order.

F. Lump Sum Safety Incentive Allowances shall be used to support, reinforce and recognize this project's safety programs. The Safety Incentive Allowance funds shall be deposited into an account at the beginning of the project. This account will be administered by the Construction Manager.

1.4 ALLOWANCE SUBMISSIONS "REQUEST FOR PROPOSALS"

SECTION 01 21 00
ALLOWANCES

A. Submit proposals for changes in the scope in the form of the “Request for Proposal”.

B. The proposal should have the amount listed as an Allowance Disbursement without the overhead and markup and a separate price listing the change with the overhead and markup included should the Owner elect to compensate for the change via Change Order.

C. Once all parties have agreed to the terms and methods of the change, an Allowance Authorization document will be initiated and executed by the Construction Manager.

D. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

E. Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each Allowance item.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

A. Lump Sum Allowances Per Contract: Include the following Allowances in the amounts stated in each specified Contract for use according the Architect/Construction Manager’s instruction.

1. General Construction
   a. Contingency Allowance $130,000.00

2. Plumbing
   a. Contingency Allowance $20,000.00

3. HVAC
   a. Contingency Allowance $55,000.00

4. Electrical
   a. Contingency Allowance $65.000.00
   b. HES Primary Power Replacement $60.000.00

5. Site Work
   a. Contingency Allowance $100,000.00

B. Note: These Allowances are in addition to specific Allowances noted elsewhere in the Contract Documents.

C. Note: All work under the Allowance will be charged with NET prices only. Overhead, profit, and bond costs for allowances are included in the base bid.

END OF SECTION

SECTION 01 22 00
UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies applicable unit prices required for each Prime Contract.

1.3 DEFINITIONS

A. Unit price is a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit Prices listed below shall be used when and if required by the Owner for all additions and/or deletions to the Contract Quantities and shall be inclusive of providing all labor, material, insurance, overhead, profit, equipment, hoisting, scaffolding, trucking, handling, submissions, layout, permits, insurance, applicable taxes, coordination, hangers, inserts, couplings, testing, delivery, supervision, etc., and shall remain in effect throughout the course of this Contract. Items covered by these Unit Prices shall be provided in accordance with the Specifications and Drawings as directed by the Construction Manager.

B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves the use of established unit prices and to have this work verified by an independent party at the Owner's expense.

C. The unit prices listed shall be for added and deleted work.

D. Cost for all unit prices shall be provided on the Bid Form.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. **General Construction**

1. GC-1 NOT USED:
   a. Description:
   b. Unit of Measurement:.
      .

B. **Plumbing**

1. P-1 NOT USED:
   a. Description: .

b. Unit of Measurement:
:

C. **HVAC**

1. H-1 NOT USED:
   a. Description:
   b. Unit of Measurement:
   c. Base Bid:

D. **Electrical**

1. E-1 NOT USED
   a. Description:
   b. Unit of Measurement:
   c. Base Bid:

E. Site Work

SC-1 Granular Base. Description: Addition or deletion of compacted granular base. See relevant Specification Sections
Unit of Measurement: Cubic Yard

SC-2 Asphalt Paving Base. Description: Construction of additional aggregate base for under asphalt paving as indicated on the Drawings. Work includes excavation and aggregate base course placement. See relevant Specification Sections.
Unit of Measurement: Cubic Yard

SC-3 Asphalt Standard Duty Paving. Description: Addition or deletion of standard duty asphalt paving section as indicated on the Drawings. Work includes aggregate base course. See Relevant Specification Sections.
Unit of Measurement: Square Yard

SC-4 Asphalt Heavy Duty Paving. Description: Addition or deletion of heavy-duty asphalt paving section as indicated on the Drawings. Work includes aggregate base course. See relevant Specification Sections.
Unit of Measurement: Square Yard

SC-5 Excavation and Replacement of Unsuitable Material Below Subgrade. Description: Excavation and removal from site, material below subgrade level outside building footprint deemed unsuitable by and as directed by Architect/Engineer and new backfill to subgrade with select granular fill. See relevant Specification Section.
Unit of Measurement: Cubic Yard

SC-6 Concrete Walks. Description: Addition or deletion of Concrete Sidewalk and subbase. See relevant details and specification sections.
Unit of Measurement: Square Foot

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

B. All Specification Sections relative to the type of work being done and the appropriate trades involved apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing Alternates.

1.3 DEFINITIONS

A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.
2. Alternate prices shall be valid up to 120 days after the date of the bid opening. Owner reserves the right to award alternates any time after bid opening.

1.4 PROCEDURES

A. Coordination: Coordinate related work and modify or adjust affected adjacent work as necessary to completely and fully integrate that work into the Project.

1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

B. Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of this Contract.

D. Schedule:

1. A “Schedule of Alternates” is included for each Prime Contract at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the work described under each alternate.
2. Wherever the work of an alternate is for the replacement, repair, refurbishment, etc.; the costs of demolition; the removal and disposal of demolition debris; cutting, patching, and refinishing adjoining materials, necessary protection, and any other associated costs for performing and completing the work shall be included in the bid price for the work.

3. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

PART 2 – EXECUTION

2.1 SCHEDULE OF ALTERNATES

A. General Construction

ALTERNATE #1 (GC) – Intermediate Gym Locker Room 118A - Demolition of metal lockers and cast masonry locker base patch floor as defined on contract documents. Mechanical equipment replacement within Intermediate Gym Locker Rooms 117A & 118A as defined on contract documents. New skylight within existing roof skylight footprint over Intermediate Gym Locker Room 117A & 118A as defined on the contract Documents and specification. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

B. HVAC

ALTERNATE #1 (HC) – Alternate Description – Intermediate Gym Locker Room 118A - Demolition of metal lockers and cast masonry locker base patch floor as defined on contract documents. Mechanical equipment replacement within Intermediate Gym Locker Rooms 117A & 118A as defined on contract documents. New skylight within existing roof skylight footprint over Intermediate Gym Locker Room 117A & 118A as defined on the contract Documents and specification. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNATE #3 (HC) – Alternate Description – Intermediate Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNEATE #4 (HC) – Alternate Description – Elementary Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

C. Plumbing

ALTERNATE #3 (PC) – Alternate Description – Intermediate Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNEATE #4 (PC) – Alternate Description – Elementary Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

SECTION 01 23 00
ALTERNATES

D. Electrical

ALTERNATE #1 (EC) – Alternate Description – Demolition of metal lockers and cast masonry locker base patch floor as defined on contract documents. Mechanical equipment replacement within Intermediate Gym Locker Rooms 117A & 118A as defined on contract documents. New skylight within existing roof skylight footprint over Intermediate Gym Locker Room 117A & 118A as defined on the Refer to drawings and specifications. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNATE #2 (EC) – Intermediate Theatrical scope called out within all IJ-TL & IJ-TS drawings and specification sections 1 9 10 00 – Performance Sound System & 19 20 00 Theatrical Lighting and Relay Systems as defined on the contract documents and specifications. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNATE #3 (EC) – Intermediate Roof scope as called out on the contract documents. Exiting mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Refer to drawings and specifications. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNEATE #4 (EC) – Elementary Roof scope as called out on the contract documents. Existing mechanical, electrical, and plumbing systems within area called out for alternate will be included within alternate pricing. Refer to drawings and specifications. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNEATE #7 (EC) – Intermediate / Junior High School Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications. Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

ALTERNEATE #8 (EC) –High School Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.
Provide all labor, material, tools and supervision to perform the referenced work as described on the drawings and specifications.

SECTION 01 23 00
ALTERNATES

E. Site Work

ALTERNEATE #5 (SC) – Elementary exterior perimeter fence replacement – removal of existing perimeter fence and tree clean up along with furnish new fence system as defined on the contract documents. Refer to drawings and specifications.

ALTERNEATE #6 (SC) – Elementary exterior scope off James Street driveway, parking lot and fencing system as defined on the contract documents. Refer to drawings and specifications.

ALTERNEATE #7 (SC) – Intermediate / Junior High Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.

.

ALTERNEATE #8 (SC) – High School Exterior Digital Sign scope in its entirety as defined on the contract documents. Refer to drawings and specifications.

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section covers the procedures for substitutions of manufacturers for project materials.

1.3 DESCRIPTION

A. This section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1.4 ACCEPTABLE MANUFACTURERS

A. The lists of acceptable manufacturers in the various sections are names of manufacturers believed to be capable of supplying one or more of the items specified in that section. Where one certain kind, type, brand or manufacture of material is named, it shall be regarded as the required standard of quality. The absence of the "or equal" clause is not meant to exclude competition in any way; similar products of other manufacturers which are equal in quality, performance and equally adaptable for the intended purposes, in the opinion of the Architect/Engineer, and are submitted as specified herein will be considered and may be accepted and shall form the basis of comparison.

B. Where two or more kinds, types, brands, manufactures, or materials are named in these specifications, they are to be regarded as the required standard of quality and are presumed to be equal. The contractor may select one of these items or, if the contractor desires to use any kind, type, brand, manufacturer, or materials other than those named in the specifications, the contractor shall indicate in writing, when requested, and prior to the award of contract, what kind, type, brand, manufacturer or material is included in the base bid for the specified item.

C. To be accepted as an equal, the equipment or material must fit the space available for it in the building. No item will be accepted as an equal if alterations of building structure or space are made necessary for a proposed product.

D. If equipment or materials is accepted as an equal, the Contractor is required to make all necessary corrections to design, details, clearances, etc., add to, furnish and install all additional materials or items required, as determined by the Architect at no additional cost to the Owner.

E. Refer to Section 01 33 00 for submittal requirements.

1.5 DEFINITIONS

A. EQUIVALENTS
   1. Refer to Specification Section 00 21 00 – Instructions to Bidders.

B. "OR EQUAL "

   1. Wherever used in Contract Documents, the phrase "or equal" means that materials, components and equipment may be proposed for use in lieu of those named. They will be considered acceptable if, in the opinion of the Architect/Engineer, they will perform the

functions imposed by the general design, if they meet the standards of the named items, and are submitted as herein specified.

C. SUBSTITUTIONS

1. Following the notification of award, the notified bidder may propose substitutions that in his opinion meet the standards of quality and/or performance criteria of the products identified on the Drawings or in the Specifications. Proposals are eligible to be considered for approval until fifteen (15) calendar days after receipt of notification of award of contract.

    a. These requests for approval of proposed substitutions will be reviewed by the ARCHITECT/ENGINEER from successful bidders only.

2. Requests for approval of proposed substitutions after fifteen (15) calendar days following receipt of notification of award of contract will be considered by the ARCHITECT/ENGINEER ONLY in the following cases:

    a. The named product cannot be obtained because of strikes, lockouts, bankruptcies or discontinuance of manufacture and, the proposed equivalent is equal to the named product in the opinion of the ARCHITECT/ENGINEER and, the use of the proposed equivalent, in the opinion of the ARCHITECT/ENGINEER, is appropriate to the project.

3. Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions". The following are not considered substitutions:

    a. Revisions to Contract Documents requested by the Owner, Construction Manager or Architect/Engineer and approved by the Architect/Engineer.
    b. Specified options of products and construction methods included in Contract Documents.

1.6 SUBSTITUTION REQUEST SUBMITTAL

A. Requests for substitution will be considered if received in a timely manner allowing adequate duration for processing and review so as not to delay any portion of the Project, and no later than 10 days, after Notice of Award of Contract. Requests received more than 10 days after award of Contract may be considered or rejected at the discretion of the Architect/Engineer and Construction Manager and shall be submitted as follows:

1. Submit the required number of each request for substitution for consideration.
2. Identify the date of request for substitution and Contract(s) involved. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information as appropriate:
    a. Product Data, including Drawing and descriptions of products, fabrication and installation procedures.
    b. Samples, where applicable or requested.
    c. A detailed comparison of significant qualities of the proposed substitution with those of the work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.

d. Coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.
e. A statement indicating the substitution's effect on the Contractor's construction schedule compared to the schedule without approval of the substitution.
f. Accurate cost data on proposed substitution in comparison with product or method specified.
g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
h. Name and address of similar projects on which product was used and date of installation.

B. The Architect/Engineer will review the request for substitution and notify the Construction Manager who will then notify Contractor of acceptance or rejection of the proposed substitution.

1.7 CONDITIONS FOR SUBSTITUTIONS

A. The Contractor's substitution request may be received and considered by the Architect/Engineer when the following conditions are satisfied, as determined by the Architect/Engineer; otherwise requests will be returned without action except to record non-compliance with these requirements.

1. Revisions to Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.
4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
5. The equipment or material must fit the space available for it in the building. No item will be considered if alteration of building structure or space is made necessary by a proposed substitution.
6. If a substitution of material or any equipment item is accepted, the Contractor is required to make all necessary corrections to details, clearances, etc., add to, furnish and install all additional materials or items required by the substitution, as determined by the Architect at no additional cost to the Owner.
7. If requested substitutions provides specified warranty.

B. In making request for substitution, Contractor represents:

1. That the Contractor has personally investigated the proposed substitute product and determined that it is equal to or superior in all respects to the specified project.
2. That the Contractor will provide the same warranty for the substitution that is required for the specified product.
3. Certifies that the substitution will not result in a cost disadvantage to the Owner; that all cost data presented is complete and that the Contractor waives all claims for additional costs related to the substitution which subsequently become apparent.
4. Will coordinate the installation of the substitution, if accepted, making such changes as may be required to make the work complete in all respects.
5. Contractor requesting substitution shall bear additional costs to all parties due to his substitution including Architect/Engineer redesigns and costs' associated but under separate contract.

SECTION 01 25 00
SUBSTITUTION PROCEDURES

C. The Contractor's submittal and Architect/Engineer's acceptance of shop drawings, product data or samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Do not permit submittals marked "Revise and Resubmit" to be used at the Project site, or elsewhere where work is in progress.

1.2 SUMMARY

A. This section covers the requirements and procedures for the schedule of values and applications for payment.

1.3 DESCRIPTION

A. Submit the Schedule of Values to the Construction Manager, within ten (10) day of Award of Contract for review and approval.

B. The Schedule of Values shall be the basis of Contractor's Application for Payment.

1.4 FORM OF SUBMITTAL

A. Submit typewritten Schedule of Values on AIA Documents G702/CMa and G703.

B. Provide dollar values for labor and material for each category of work, broken out by each location, per building and SED number, additions, renovations, building area, site work.

C. Refer to Example found in Section 00 85 20 – Project Forms and Documents.

1.5 PREPARING SCHEDULE OF VALUES

A. Itemize separate line item cost for each of following general cost items.

1. Performance and Payment Bonds
2. Project Insurance
3. Mobilization (Total cost not to exceed 0.005% of total contract value)
4. Demobilization
5. Field Supervision (Total cost paid equally on a monthly basis based on duration of project)
6. Surveys and Layout
7. Temporary Facilities
8. Project Meetings
9. Project Safety
10. Cleaning-Up (Daily) (Total cost paid equally on a monthly basis based on duration of project)
11. Mock Ups and Samples
12. Coordination Drawings
13. Submittals and Shop Drawings
14. Operations and Maintenance Manual (including construction record drawings)
15. As-Built Drawings
16. Testing & Commissioning
17. Training
18. Project Close-Out. An amount of at least one percent (1%) of the Contract value shall be carried for this line item, but not less than $25,000.
19. Warranties

20. Punchlist
21. Each Allowance associated with the Contract
22. Each Alternate accepted
23. Each Change Order as it is issued

B. Show total costs including overhead and profit.

1.6 REVIEW AND RESUBMITTAL

A. After review by Construction Manager, revise and resubmit Schedule of Values, as needed.

B. First Application for Payment will not be approved until Construction Manager and/or Architect approves Schedule of Value format.

1.7 REQUIREMENTS AND SUBMITTAL PROCEDURE

A. Labor Rate Breakdown

1. For each Labor Classification employed or for which employment is anticipated, submit a detailed breakdown of the components of the Total Hourly Rate on the form in section 00 85 20 " Project Forms and Documents". Prime Contractors shall also secure and submit an hourly labor rate breakdown for each of the Subcontractor's classifications contracted with the Prime Contractor.
2. Furnish separate pages for each time period for which labor rates are effective.
3. Calculations on the labor rate breakdown shall reflect actual costs and shall be in accordance with Contract Requirements. Hourly Rates shown on the Labor Rate Breakdown shall be the basis upon which changes for approved time and material Work is charged.

B. Submit Approved Applications for Payment to the Construction Manager by the last day of each month.

1. Draft copies shall typically be received by the 25th of each month for review and approval by the Construction Manager Construction Project Manager/Superintendent prior to formal submission.
2. Applications shall reflect an accurate projection of work, which the Contractors anticipate will be completed through the end of each month, as agreed to by the Construction Manager and the Architect/Engineer.

C. With permission of the Construction Manager, stored materials can be billed for in the monthly payment application at invoice cost. No Overhead & Profit will be allowed on stored materials. Contractors will be allowed to bill for the Overhead & Profit, once the stored material is incorporated into the project. Invoices and proof of insurance for material stored must be provided with the Monthly Application for Payment when billing for stored materials. This is a requirement for materials stored on or offsite. Materials stored off site must have a certificate of insurance for said material stored offsite at a particular location. The Construction Manager may request photos be provided of materials being stored off site to verify materials are marked for this project.

D. Billing for change work will only be authorized once the work is complete and an Allowance Authorization documents has been issued or a Change Order has been fully executed by all parties.

SECTION 01 29 00
PAYMENT PROCEDURES

1.8 FORMAT AND DATA REQUIRED

A. All amounts shall be rounded to WHOLE DOLLARS on the Application form.

B. All substantiating data and attachments required by the Contract Documents shall accompany each Application for Payment upon submission in the form required by the Construction Manager.

1. Substantiating Data for Applications for progress payments include, but are not limited to, the following requirements:
    a. Affidavit and Waiver of Lien* on the form in section 00 85 20.
    Forms indicated thus (*) are for the previous month's application and are therefore to be submitted with every Application through and including the latest pay period prior to the date of submittal of the Application.
    b. Two (2) Copies of Certified Payrolls on standard New York Department of Labor forms.
    c. Invoices and photographs for stored material.

C. When the Construction Manager requires additional substantiating data, Contractors shall promptly submit suitable information with a cover letter.

D. Payments will not be allowed on work items without approved Submittals.

E. Transmittal: Submit four (4) signed and notarized original copies of each Application for Payment to the Construction Manager. All copies shall be complete, including waivers of lien and similar attachments.

1.9 FINAL APPLICATION FOR PAYMENT

A. Completion of all Work includes completion of all items noted on all Punch Lists, which have been forwarded to the Contractors.

B. Upon final completion of all work, Contractors may submit an Application for Final Payment, which shall include:

1. Executed "Final Release" (Final Waiver of Claims and Liens and Release of Rights).
2. Contractor’s Affidavit Of payment Of Debt And Claims, AIA Document G706.
3. Contractor’s Affidavit Of Release Of Liens, AIA Document G706A.
4. Executed "Final Release from Subcontractor or Supplier" from each Subcontractor and Supplier.
5. Executed "Consent of Surety Company to Final Payment"(AIA Document G707), if applicable.

C. Full and Final Payment will not be made until the following have been supplied, approved and accepted by the Owner, Construction Manager and the Architect/Engineer.

1. One (1) year written warranty (Maintenance Guarantee).
2. Current certificate of insurance to coincide with the warranty period.
3. The required number of copies of all written guarantees, warranties, operating and maintenance manuals, and test results.
4. Documentation that all verbal and written instructions and instruction sessions required by the Contract have been completed. Deliver video recorded training on digital media to be inserted into Operation and Maintenance Manuals.

5. The required number of copies of all Project Record Documents including "As-built" drawings, approved Shop Drawings and Product Data.
6. All materials and equipment required as stock.
7. Any other requirement of the Contract Documents which is outstanding.
8. Certificate of Compliance.
9. Certificate of completion of all Substantial Completion Inspection Report and Final Completion Inspection Report items (commonly referred to as punch-list items).

1.10 REQUISITIONING INSTRUCTIONS

A. Any requisitions submitted using other forms than those referenced in this manual will be returned. Submission of all required forms is a condition precedent to payment.

B. The Partial Waiver of Lien is to be for the current requisition and the Affidavit of Payments is to be for the previous requisitions and is to be submitted starting with the second requisition. The Final Waiver of Lien is to accompany the final requisition.

C. All insurance certificates and bonds must be submitted and approved in accordance with the contract requirements prior to submitting or processing of requisitions. NO PAYMENTS WILL BE MADE UNTIL SATISFACTORY INSURANCE CERTIFICATES AND BONDS ARE RECEIVED.

D. Requisitions are to be submitted according to the Payment Application Schedule and shall reflect work anticipated to be completed by the end of the month. Requisitions submitted after the dates shown on the Payment Application Schedule may not be processed until the following month. Once an amount has been approved for payment, no further monies can be approved until a new requisition has been received. Until final payment has been made on a contract, requisitions should be submitted each month.

E. Application for Payment

    1. This schedule includes the following:
        a. The figures under the Contract and Orders and Value of Work Completed are the totals and should be indicated on a summary page.
        b. Deductions include retained percentage and amount as per the contract, total payments received by the date of the requisition and back-charge totals to date.
        c. The balance due for payment at this request is the value of the work completed less deductions.

F. Time and Material work is handled by the issuance of Change Orders or authorized against the Allowance and can be processed only upon completion of the Rate Sheets for each labor category in conformance with the Contract.

G. Field tickets are to be submitted to the Construction Manager Superintendent. Contractor must obtain the written approval of the Superintendent for all field tickets. Field tickets without the Superintendent’s approval will not be processed.

H. Invoices are to be submitted to the Construction Manager for issuance of a Change Order or Allowance authorization with a copy of the approved field ticket.

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Delegated Design

C. Preconstruction meeting.

D. Progress meetings.

E. Superintendent's meetings.

F. Preinstallation meetings.

G. Number of copies of submittals.

H. Submittal procedures.

I. Electronic submittal procedure.

1.2 RELATED REQUIREMENTS

A. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.

B. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.

C. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. Coordination Document: The HVAC/Mechanical, Plumbing and Electrical Trades Contractors shall execute a coordination document identifying primary utilities in shared spaces. Circulation of the coordination document will be in the order contract trades are listed above. Conflicts in utility coordination are to be brought to the attention of the Construction Manager. Copies of the final coordination document will be distributed to each trade.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements. Install utilities parallel with structure and as inconspicuous as possible in exposed spaces.

F. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4 DELEGATED DESIGN

A. All work requiring the services of a Delegated Design Professional shall be conducted by a Licensed Professional Engineer, licensed in the State of New York.

B. All items submitted by the Delegated Design Professional shall be signed and sealed by the Licensed Professional Engineer. These submittals shall include, but are not limited to:
1. Shop Drawings and details.
2. Design calculations, including loading, stresses, and connections.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

A. Construction Manager will schedule a meeting after Notice of Award.

B. Attendance Required:
1. Owner.
2. Architect.
3. Contractor.
4. Construction Manager.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
5. Submission of Contractor's Infectious Disease Preparedness Plan and Basic Infection Prevention Measures.
6. Submission of initial Submittal schedule.
7. Designation of personnel representing the parties to Contract and Architect.
8. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
9. Scheduling.

D. Construction Manager will record minutes and distribute copies two days after meeting to participants, with copies to participants, and those affected by decisions made.

3.2 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.

B. Construction Manager will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.
6. Construction Manager.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to work.

E. Construction Manager will record minutes and distribute copies within two days after meeting to participants, with copies to participants, and those affected by decisions made.

3.3 PREINSTALLATION MEETING

A. When required in individual specification sections, convene preinstallation meeting at Project site prior to commencing work of specific section.

B. Require attendance of parties directly affecting, or affected by, Work of specific section.

C. Notify Architect/Engineer seven days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.

E. Construction manager will record minutes and distribute copies after meeting to participants, with copies to Architect/Engineer, Owner, and those affected by decisions made.

3.4 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.
2. Coordinate with Contractor's construction schedule and schedule of values.
3. Format schedule to allow tracking of status of submittals throughout duration of construction.

4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
    a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.5 COORDINATION MEETINGS

A. The Construction Manager will conduct Project Coordination Meetings weekly or on an "as-needed" basis. Project Coordination Meetings are in addition to specific meetings held for other purposes, such as regular Project Meetings and special Pre-Installation Meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. The Construction Manager will record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

3.6 SUBMITTAL

A. General:
1. Transmit each submittal with form provided by Architect via Newforma Info Exchange.
2. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
3. Identify Project, Contractor, Subcontractor, or Supplier; pertinent drawing and detail number, and specification number, as appropriate on each copy.
4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
5. Deliver submittals, containing samples, to Architect at Airport Corporate Park, 100 Hunt Center, Horseheads, NY 14845-1019. All other submittals to be submitted through Newforma Exchange as specified below.
6. Schedule submittals to expedite the Project, and coordinate submission of related items.
7. For each submittal for review, allow fifteen (15) days excluding delivery time to and from the Contractor.
8. Identify variations from Contract Documents and Product or System limitations that may be detrimental to successful performance of the completed Work.
9. When revised for resubmission, identify all changes made since previous submission.
10. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
11. Submittals not requested, or incomplete, will not be recognized or processed.

B. Proposed Product List:
1. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
2. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

C. Product Data: Submit to for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
1. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
2. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

3. After review distribute in accordance with Submittal Procedures article above and provide copies for record documents described in Section 01 70 00.

D. Shop Drawings: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Do not reproduce the Contract Documents to create shop drawings.
   3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
   4. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
   5. After review distribute in accordance with Submittal Procedures article above and provide copies for record documents described in Section 01 70 00.

E. Samples: Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
   1. Samples For Selection as Specified in Product Sections:
      a. Submit to Architect/Engineer for aesthetic, color, or finish selection.
      b. Submit samples of finishes from full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Architect/Engineer selection.
   2. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   3. Include identification on each sample, with full Project information.
   4. Submit number of samples specified in individual specification sections; Architect/Engineer will retain one sample.
   5. Reviewed samples which may be used in the Work are indicated in individual specification sections.
   6. Samples will not be used for testing purposes unless specifically stated in specification section.
   7. After review distribute in accordance with Submittal Procedures article above and provide copies for record documents described in Section 01 70 00.

F. Design Data
   1. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
   2. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

G. Test Reports
   1. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
   2. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

H. Certificates
   1. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
   2. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   3. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

I. Manufacturer's Instructions
   1. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing.
   2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

J. Manufacturer's Field Reports

1. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
2. Submit report in duplicate within 30 days of observation for information.
3. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

K. Erection Drawings
1. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

3.7 ELECTRONIC SUBMITTAL PROCEDURES - NEWFORMA

A. Using the PDF cover sheet provided by the Architect, fill out the information required for the submittal. Each submittal must be provided with the submittal cover sheet.

B. Combine PDF cover sheet with product submittal. Cover sheets are to precede the product submittal information.

C. If shop drawings are over 11" x 17" in size, hard copies are to be provided.

D. Electronic submittals shall be up-loaded to the Project Team through Newforma Info Exchange. Directions to access Newforma will be provided by the Architect.

E. Notification will be automatically be generated by Newforma to the Project Team when a new submittal has been created.

3.8 ARCHITECT'S/ENGINEER'S SUBMITTAL ACTION

A. Except for submittals for the record or information, where action and return is required, the Architect or his consultant will review each submittal, mark to indicate action taken, and return.
1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Architect/Engineer will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
1. Final Unrestricted Release: When the Architect marks a submittal "Reviewed" the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
2. Final-But-Restricted Release: When the Architect marks a submittal "Reviewed as Noted," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
3. Returned for Re-submittal: When the Architect marks a submittal " Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
a. Do not use, or allow others to use, submittals marked " Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
4. Rejected: When the Architect marks a submittal “Rejected,” do not proceed with any Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Prepare a new submittal conforming to the product characteristics specified by the contract documents; resubmit without delay. Repeat if necessary to obtain different action mark.
5. Submit Specified Item: When submittal is marked “Submit Specified Item”, the Contractor shall immediately resubmit the specified item.

C. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned marked “Action Not Required”.

END OF SECTION

SECTION 01 31 00
PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Each Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific trade contractor.

1.3 GENERAL PROJECT COORDINATION

A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other prime contractors for proper installation, connection, and operation.

1. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
2. Make provisions to accommodate items scheduled for later installation.
3. Each Prime Contractor shall provide a layout drawing of all wall, floor, ceiling and roof penetrations that they require to the General Construction Contractor and Construction Manager. The General Construction Contractor will be responsible to provide wall penetrations based on the layout and penetration drawing provided by Each Prime Contractor requiring a penetration.
4. Each Prime Contractor is responsible for providing fire caulk or sound caulk from their penetrating device to the adjacent construction.
5. If is there is a required sleeve for the penetration, it is the Prime Contractors' responsibility requiring the penetration to provide the sleeve as well as the fire caulk or sound caulk of the sleeve to the penetrating device.
6. Schedule work and cooperate with others to avoid delays, interferences, and unnecessary work, conforming to the construction schedule.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work.

D. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

E. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

F. In the event that penetration drawings are not received prior to wall, floor, ceiling, or roof construction, the Prime Contractor requiring the penetration will bear all responsibility for layout, sleeves, cutting, patching, and fire / sound caulking the required penetration.

1.4 SURVEY AND RECORDS

A. General: Working from lines and levels established from existing conditions and by the property survey, the General Construction Contractor shall establish and maintain benchmarks and other dependable markers. These benchmarks and markers are established to set lines and levels for Work at each story of construction and elsewhere as needed to properly locate each element for Project. Each Prime Contactor shall calculate and measure required dimensions, and locate its Work in coordination with such benchmarks. Drawings shall not be scaled to determine dimensions.

B. Procedure: Before proceeding with the layout of actual Work, each Prime Contractor shall verify the layout information indicated, in relation to the property survey, existing benchmarks, and existing conditions. As work proceeds, check every major element for line, level and plumb. Record deviations for required lines and levels and upon detection, promptly advise the Construction Manager of deviations exceeding indicated or recognized tolerances. Each Prime Contractor shall record deviations on the Project Record Drawing.

1.5 COORDINATION MODEL / DRAWINGS

A. Coordination Model / Drawings: Prepare Coordination Drawings for all areas, by building, floor, area and/or phase, of the Homer High School Portion of the project. Close attention should be implemented where limited space availability necessitates maximum utilization of space for efficient installation of different components; in the following manner:

1. General Construction, HVAC, Electrical, and Plumbing Prime Contractors are responsible to prepare electronic 3D coordination model/drawings, compatible with “Navisworks” (Revit 2015 is the preferred software) ; detailing major elements, components, systems and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including but not limited to the following:
    a. Proposed locations and penetrations of ductwork, piping, equipment, dampers, insulation, lighting, conduits, sprinkler heads and other equipment and materials needed for coordination.
    b. Clearances for installing and maintaining insulation.
    c. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
    d. Equipment connection and support details.
    e. Exterior wall and foundation penetrations.
    f. Fire rated wall, floor, ceiling, and roof penetrations.
    g. Sizes and location of required concrete pads and bases.
    h. Valve stem movement.
    i. Sleeves.

2. Prepare 3D drawings and details to indicate layouts, penetrations in floors, walls and ceilings and their relationship to other penetrations and installations. Clearly define relationships between sleeves, piping, ductwork, conduit, ceiling grid, lighting, fire sprinkler, HVAC equipment and other mechanical, plumbing, and electrical equipment with other components of the building such as beams, columns, ceilings, and walls.

3. Indicate installations of air outlets and inlets, light fixtures, communication systems components, and other ceiling mounted items on the ceiling plane.

4. Resolve conflicts between trades, prepare revised coordination drawings/layouts and Re-submit coordination drawings/layouts to Architect/Engineer and Construction Manager.

5. The HVAC, Plumbing and Electrical drawings are schematic in nature and are not intended to show every offset and detail. The Contractors will make adequate provisions in their bid to accommodate the actual conditions, provide all required ductwork, piping and conduit offsets per the coordination drawings without additional cost to the Owner.

B. The Architect will provide the “base” 3D Revit model after bid award including building shell, structure, walls and ceilings. Revit model’s will be created in Revit.

C. The Architect will assemble the coordination model using the 3D model/drawings submitted by each contractor and be responsible for managing the coordination model clash detection resolution meetings. The Architects work will be covered by the Coordination Model Allowance under the HVAC Prime Contract. All Contractors coordination model/drawing efforts will be included in their base bid cost.

D. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

E. The coordination model/drawings and clash detection shall be coordinated with the construction and phasing schedule. A coordination model/drawing and clash detection timeline schedule shall be developed and tracked.

F. Affected contractors shall attend coordination meetings at regular intervals required to maintain the construction schedule as scheduled by the Construction Manager.

G. Coordination drawings to be signed off by affected Contractors.

1.6 LOCATION STREAMERS

A. The HVAC, Electrical and PlumbingContractors shall hang streamers from all above ceiling equipment that will require access. This is in addition to any specification requirements for tags, labels, etc. Shop drawings should also highlight these areas for Architect/Engineer’s review. In addition, the Contractors shall notify the Construction Manager and Architect/Engineer of all areas where equipment maintenance access is difficult. Coordinate architecturally placed access doors with points of mechanical / electrical systems requiring that access.

END OF SECTION

SECTION 01 31 20
PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Each Contractor shall participate in al project meetings in order to facilitate coordination between trades.

1.3 DESCRIPTION

A. Construction Manager shall schedule and administer project meetings.

B. Architect/Engineer and Owner may attend meetings.

1.4 PRE-CONSTRUCTION MEETING

A. Schedule within fifteen (15) days after notice of award of Contracts.

B. Attendance:
1. Construction Manager
2. Architect/Engineer
3. Contractor and pertinent Subcontractors
4. Owner's Representative

C. Minimum Agenda:
1. Introduction and sign in of attendees.
2. Contractor to submit:
    a. List of major Subcontractors and Suppliers.
    b. Tentative procurement and construction schedule.
    c. Staff names.
    d. Preliminary Submittal Schedule.
    e. Labor Rate Sheet: Provide for each trade classification of Prime Contract workforce on form per Section 00 85 20 “Project Forms and Documents.”
3. Construction Manager to provide overview of projected construction milestones and schedules.
4. Designation of responsible personnel for coordination of work between Contractors.
5. Safety and job rules.
6. Change Orders: Overhead and profit markups.
7. Distribution of Contract Documents.
8. Shop drawing, product data, and samples.
9. Record Documents.
10. Use of premises:
    a. Field office and storage area.
    b. Owner's requirements.
    c. Identification badges.
    d. Working hours.
    e. Telephone use.
11. Project Orientation.
12. Project Safety requirements and training.
13. Distribution of Contract Documents.

14. Major equipment deliveries and priorities.
15. Coordination Drawings.
16. Clean-up procedures.
17. Location and time for progress meetings.

1.5 PREINSTALLATION CONFERENCES

A. Construction Manager shall conduct pre-installation conferences at Project site before each construction activity that requires coordination with other construction and as identified in individual specification Sections as follows:

B. Attendees: Prime Contractor, Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Construction Manager shall advise Architect of scheduled meeting dates.

C. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

1. Deliveries.
2. Possible conflicts including compatibility problems.
3. Conformance with Construction Manager's Project construction schedule.
4. Projected weather limitations.
5. Manufacturer's written recommendations.
6. Warranty requirements and manufacturers inspection notification.
7. Acceptability of substrates.
8. Testing and inspecting requirements, if any.

D. Construction Manager: Record significant conference discussions, agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within five (5) days of the meeting.

1. Do not proceed with installation if Conference is not successfully concluded. Construction Manager shall initiate required actions to resolve impediments to performance of Work and reconvene the Conference at the earliest date feasible.

1.6 PROGRESS MEETINGS

A. Schedule for regular weekly Foreman Meetings will be set up at the Pre-Construction Meeting.

B. Schedule for regular bi-weekly Project Manager and Architect Meetings will be set up at the Pre-Construction Meeting.

C. Attendance:

1. Construction Manager
2. Contractors' Project Superintendent
3. Contractors' Project Manager
4. Subcontractors pertinent to agenda
5. Architect and Engineer
6. Owner's Representative

D. Minimum Agenda:

1. Review of Safety issues. Safety Leadership Team shall attend quarterly.
2. Review minutes of previous meeting.
3. Review and note field observations, problems, and decisions.
4. Identify present problems and necessary resolutions.
5. Contractors' shall providethree week look ahead schedules to be reviewed in conjunction with the project master schedule.
6. Review status of shop drawings and submittals.
7. Product procurement & deliveries.
8. Status of RFI's.
9. Coordinate occupancy arrangements and access requirements with Owner as required.
10. Status of Change Events.
11. Owner issues.
12. Architect & Engineers issues.
13. Open Discussion.
14. Location and time for next meeting.

E. Contractors are required to attend Progress Meetings. Unexcused absences from Progress Meetings will result in a deduct Change Order in the amount of $150.00 for each absence. Meeting attendees shall have the authority to make decisions on behalf of the firm they represent.

1.7 OTHER MEETINGS

A. Pre-demolition Conference.

B. Coordination Model/Drawing Meetings – Refer to Specification 01 31 00 for additional information.

C. Incident & Injury Free (IIF) Supervisory Skills Meetings – Refer to Specification 01 35 00 for additional information.

1.8 PERSONNEL

A. Supervision: Each Prime Contractor's project manager and field superintendent throughout project duration shall have five years experience minimum in the proposed position.

1. Two (2) years minimum of the five (5) years experience for position shall be with Prime Contractor's firm.

B. Should in the opinion of the Construction Manager, Architect or Owner, the project manager, superintendent or other Contractor's employees or subcontractor personnel prove unqualified for their position at any point in the project, the Construction manager shall issue a letter stating that the person is to be removed from involvement in the project.

1. Action must be made by Prime Contractor within seven working days of receipt of such letter.

C. Staff Names: At Preconstruction conference each Prime Contractor shall submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities. List business addresses and telephone numbers, including business office, field office, cellular, and facsimile. Each prime contractor shall submit a list of emergency contact names and phone numbers.

SECTION 01 31 20
PROJECT MEETINGS

1. Post copies in Project meeting room, each temporary field office and at each temporary telephone.

Provide corresponding identification badge number for each staff listed.

END OF SECTION

SECTION 01 32 00
CONSTRUCTION SCHEDULES, PHASING AND SITE LOGISTICS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section addresses the requirements of construction schedules.

1.3 DESCRIPTION

A. All Prime Contractors are required to submit a schedule based on the milestone dates in the following schedule to the Construction Manager for review and comments no later than ten (10) days after Notice to Proceed for the Work is issued.

B. Each Prime Contractor shall prepare an Overall Project Schedule for the project. All schedules submitted must be neat, legible, and reproducible. Contractors Overall Project Schedule shall be submitted on a full size print and in electronic format. Schedules are subject to the review and acceptance of Construction Manager.

C. Construction Manager shall approve or request modification of schedule submittals and work with the Contractor to achieve overall project goals. Construction Manager will establish and update a master project schedule based upon approved schedule submittals.

D. Each Prime Contractor is to review the approved schedule throughout the project and attempt to resolve any conflicts. Unresolved conflicts, or any problem that may affect overall project goals, shall be immediately brought to the attention of the Construction Manager.

E. Three-week look ahead schedules shall be prepared weekly by each Prime Contractor and shall correlate with the overall Project Schedule. These plans are to be submitted to the Construction Manager two (2) working days prior to the scheduled site progress meetings. Three-week look ahead schedules shall be submitted on contractor's own forms subject to Construction Manager’s review and approval. Construction Manager will review these plans and publish same, as approved, to other Prime Contractors.

F. Contractors shall provide a Recovery Schedule as requested by the Construction Manager and provide all labor force necessary, including overtime, to recover any lost time in the Schedule.

1.4 PROJECT SCHEDULE DESCRIPTIONS

A. Each Prime Contractor's initial Overall Project Schedule shall be based upon and respond to overall project objectives and information available to the Contractor through direct observation, research and examination of project documents, and discussions with Construction Manager. This initial schedule shall be submitted within ten (10) days of Notice to Proceed. Each Prime Contractor shall indicate significant events such as submittals, shop drawings, material ordering, fabrication, delivery, coordination precedents, installation, testing, and turnover by area or system as agreed with Construction Manager. Points of interface between Subcontractors and other Prime Contractors, prerequisite work, durations, milestones and overall project objectives shall be detailed. Once approved by Construction Manager, the schedule shall be considered the Master Project Schedule, signed off by all trades, and will be updated bi-weekly by the Construction Manager.

SECTION 01 32 00
CONSTRUCTION SCHEDULES, PHASING AND SITE LOGISTICS

B. Construction Manager's Master Project Schedule will be based upon project objectives and each Prime Contractors' approved schedules as described above. Weekly reviews of the Master Schedule will be held with the Prime Contractor's throughout the duration of the project. Each Prime Contractor shall participate in developing, implementing, updating and maintaining the master schedule. In addition each Prime Contractor is to review the approved Project Schedule and attempt to identify conflicts with other trades. Conflicts, or any problem that may affect overall project goals, shall be immediately brought to the attention of Construction Manager.

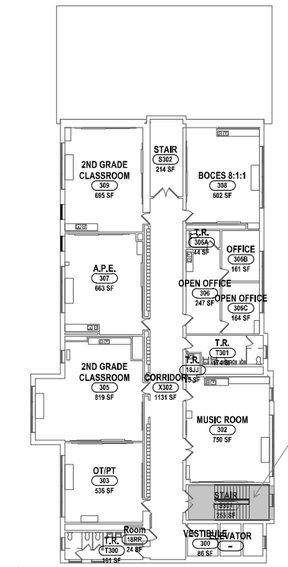
C. Integrate delivery dates of critical items of materials and equipment into the schedule. Each Prime Contractor shall keep the Construction Manager apprised of the status of shipping dates, shipments and deliveries throughout the project. Each Prime Contractor shall communicate with suppliers as necessary to assure compliance and shall be responsible for notifying the Construction Manager of changes in delivery dates, which affect the progress of the project. Contractors must take all steps to ensure that materials are delivered to the project when required by the schedule. All costs associated with material delays shall be borne by the Contractor responsible for the delay.

D. All Contractors shall cooperate with each other in the installation and construction of each Contractor's work and in such manner as the Owner or Construction Manager may direct. All Contractors shall control and coordinate the work of their subcontractors. The Owner or Construction Manager may request the modification of the work schedules of individual contractors so the whole project progresses as one unit. The award of more than one Contract for the Project requires sequential or otherwise interrelated contractor operations, and may involve delays in the progress of any individual Contractor's work. Accordingly, the Owner and/or the Construction Manager cannot guarantee the unimpeded operations of any Contractor. Each Contractor acknowledges these conditions caused by the presence or operations of other Contractors engaged upon the Project.

E. Contractor understands that time is of the essence and will provide sufficient manpower to successfully complete the contract work in accordance with the Project Schedule. A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the project.

F. The Phasing Plans, Site Logistics Plans and Milestone Schedule that follows are to be used as the baseline for developing the Prime Contractors Schedule as noted in item "A" above.

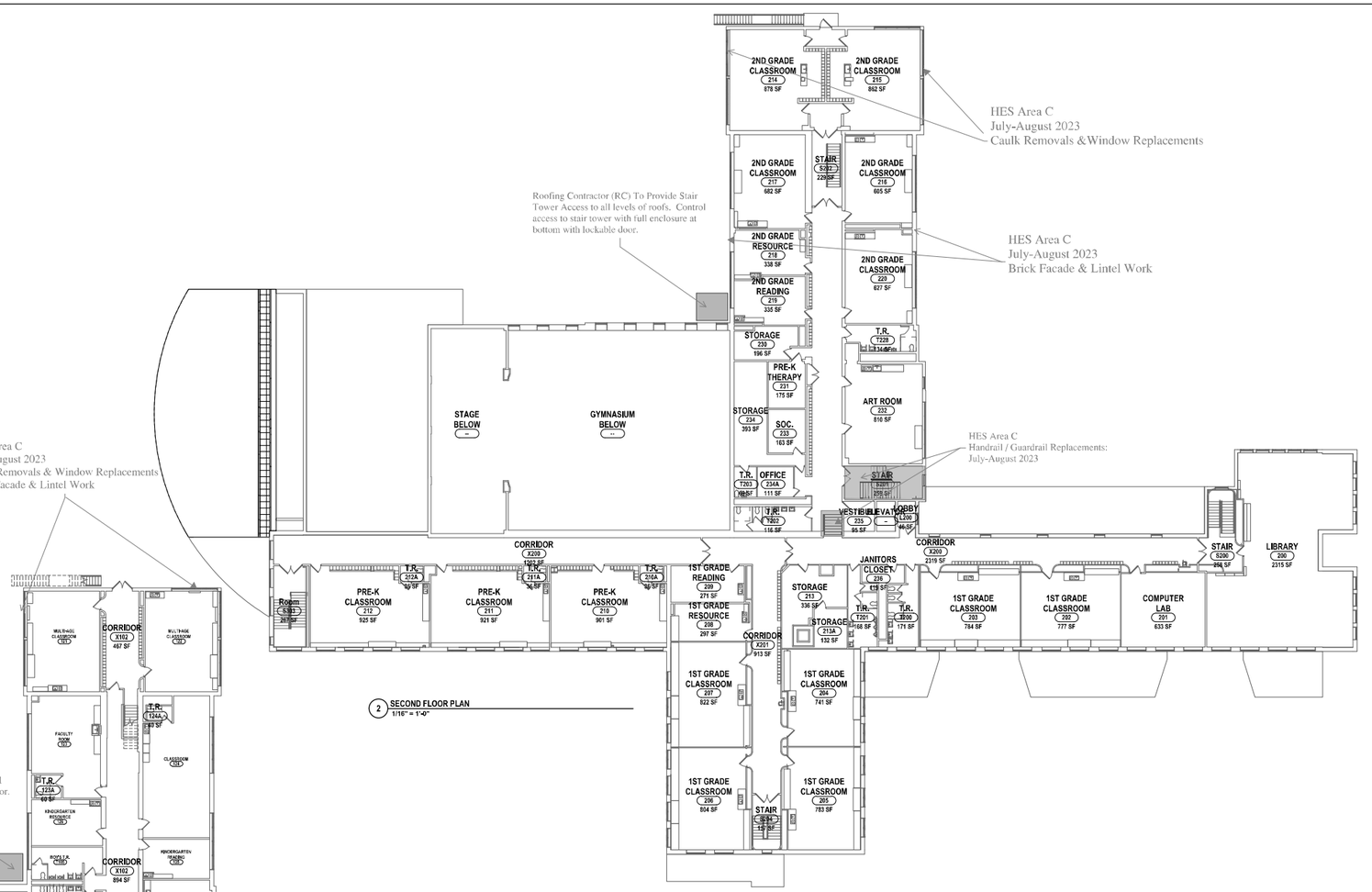
END OF SECTION



3 THIRD FL.
1/16" = 1'-0"

HES Area C
Handrail / Guardrail Replacements:
July-August 2023

HES Area C
July-August 2023
Caulk Removals & Window Replacements
Brick Facade & Lintel Work



2 SECOND FLOOR PLAN
1/16" = 1'-0"

Roofing Contractor (RC) To Provide Stair Tower Access to all levels of roofs. Control access to stair tower with full enclosure at bottom with lockable door.

HES Area C
July-August 2023
Brick Facade & Lintel Work

HES Area C
Handrail / Guardrail Replacements:
July-August 2023

RC To Provide Stair Tower Access. Control access to stair tower with full enclosure at bottom with lockable door.

CONTRACTOR ACCESS / EGRESS

Demolish Kitchen Equipment That Gets Replaced

Remove stage rigging

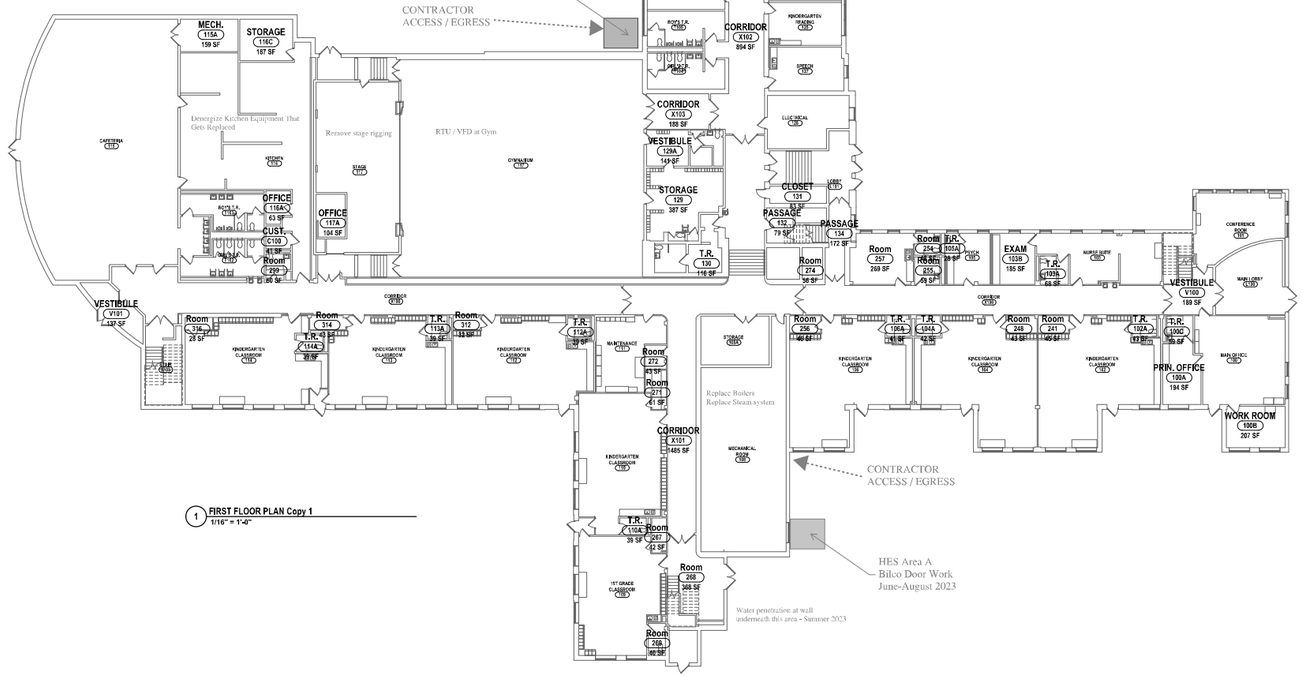
RTU / VFD at Gym

Replace Boilers
Replace Steam system

CONTRACTOR ACCESS / EGRESS

HES Area A
Bilco Door Work
June-August 2023

Water penetration at wall underneath this area - Summer 2023



1 FIRST FLOOR PLAN Copy 1
1/16" = 1'-0"

EXTERIOR WORK (Site)
June - September 2023
- PLAYGROUND REMOVALS (x 2) / INSTALL NEW (1)
- STORMWATER INFILTRATION SYSTEM / DRAINAGE WORK
- SITE LIGHTING
- PARKING AREA / SIDEWALK REMOVALS / REPLACEMENT
- EC - UNDERGROUND PRIMARY POWER AND FIBER

EXTERIOR WORK (Building)
June 2023 - September 2023
- Rooftop equipment support

June 2023 - September 2023
- Area A Roof Replacement
- Area B Roof Replacement
- Area C Roof Replacement

Homer Elementary School - Phasing Plan

DRAWN BY:	LECHASE
CHECKED BY:	JSB
DATE:	09/12/2022
SCALE:	
REVISION:	

"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

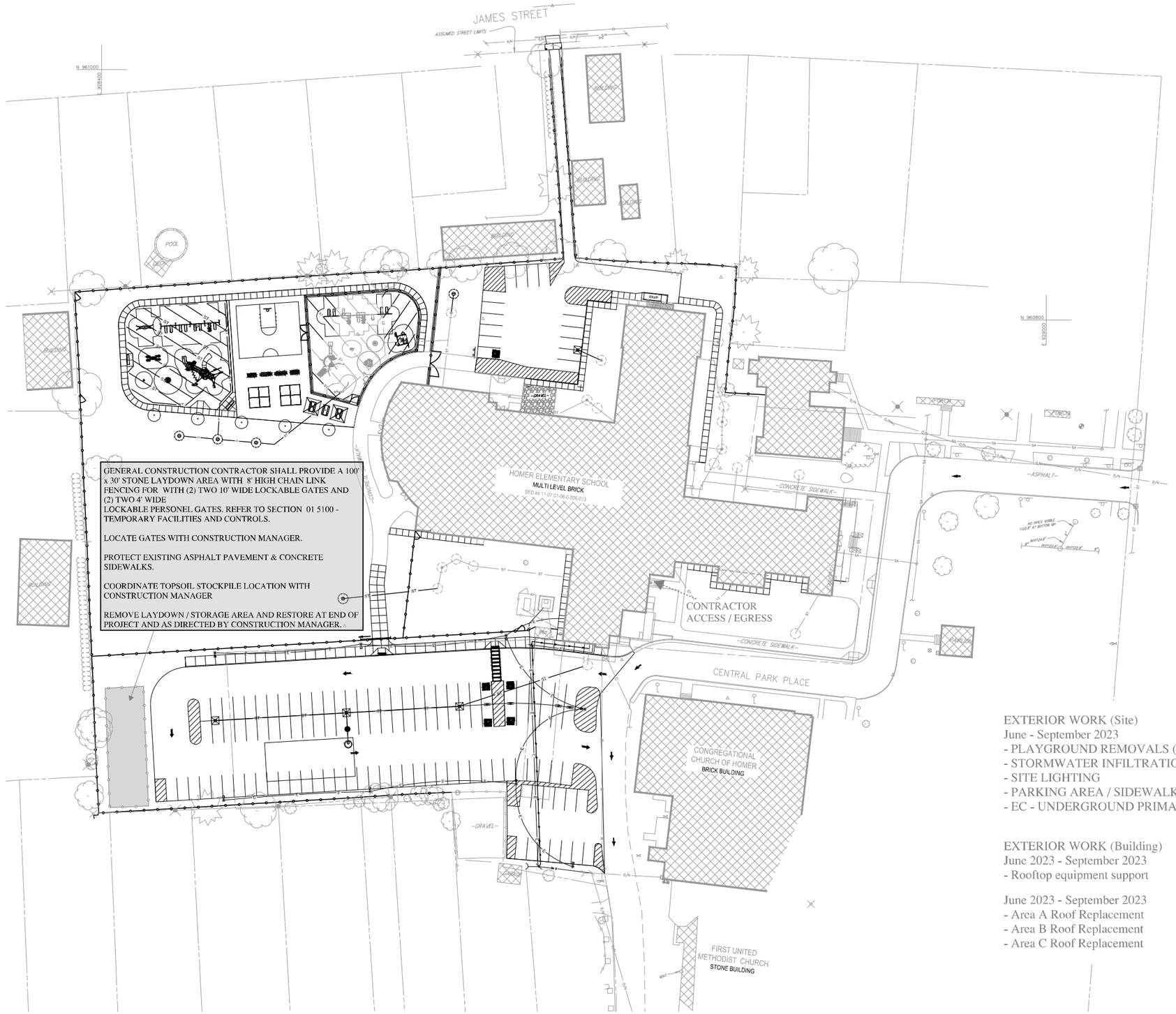
HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4668

ELEMENTARY SCHOOL CM PHASING PLAN
2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

ES-CM1

PROJECT NO: 2503.036

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001



GENERAL CONSTRUCTION CONTRACTOR SHALL PROVIDE A 100' x 30' STONE LAYDOWN AREA WITH 8' HIGH CHAIN LINK FENCING FOR WITH (2) TWO 10' WIDE LOCKABLE GATES AND (2) TWO 4' WIDE
LOCKABLE PERSONEL GATES. REFER TO SECTION 01 5100 - TEMPORARY FACILITIES AND CONTROLS.

LOCATE GATES WITH CONSTRUCTION MANAGER.

PROTECT EXISTING ASPHALT PAVEMENT & CONCRETE SIDEWALKS.

COORDINATE TOPSOIL STOCKPILE LOCATION WITH CONSTRUCTION MANAGER

REMOVE LAYDOWN / STORAGE AREA AND RESTORE AT END OF PROJECT AND AS DIRECTED BY CONSTRUCTION MANAGER.

1 SITE STAGING PLAN
SCALE: 1" = 30'

EXTERIOR WORK (Site)
June - September 2023
- PLAYGROUND REMOVALS (x 2) / INSTALL NEW (1)
- STORMWATER INFILTRATION SYSTEM / DRAINAGE WORK
- SITE LIGHTING
- PARKING AREA / SIDEWALK REMOVALS / REPLACEMENT
- EC - UNDERGROUND PRIMARY POWER AND FIBER

EXTERIOR WORK (Building)
June 2023 - September 2023
- Rooftop equipment support

June 2023 - September 2023
- Area A Roof Replacement
- Area B Roof Replacement
- Area C Roof Replacement

SCALE IN FEET
0 15 30 60 90
SCALE: 1" = 30'

Homer Elementary School - Site Logistics Plan

DRAWN BY:	LECHASE
CHECKED BY:	JSB
DATE:	09/12/2022
SCALE:	
REVISION:	

"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

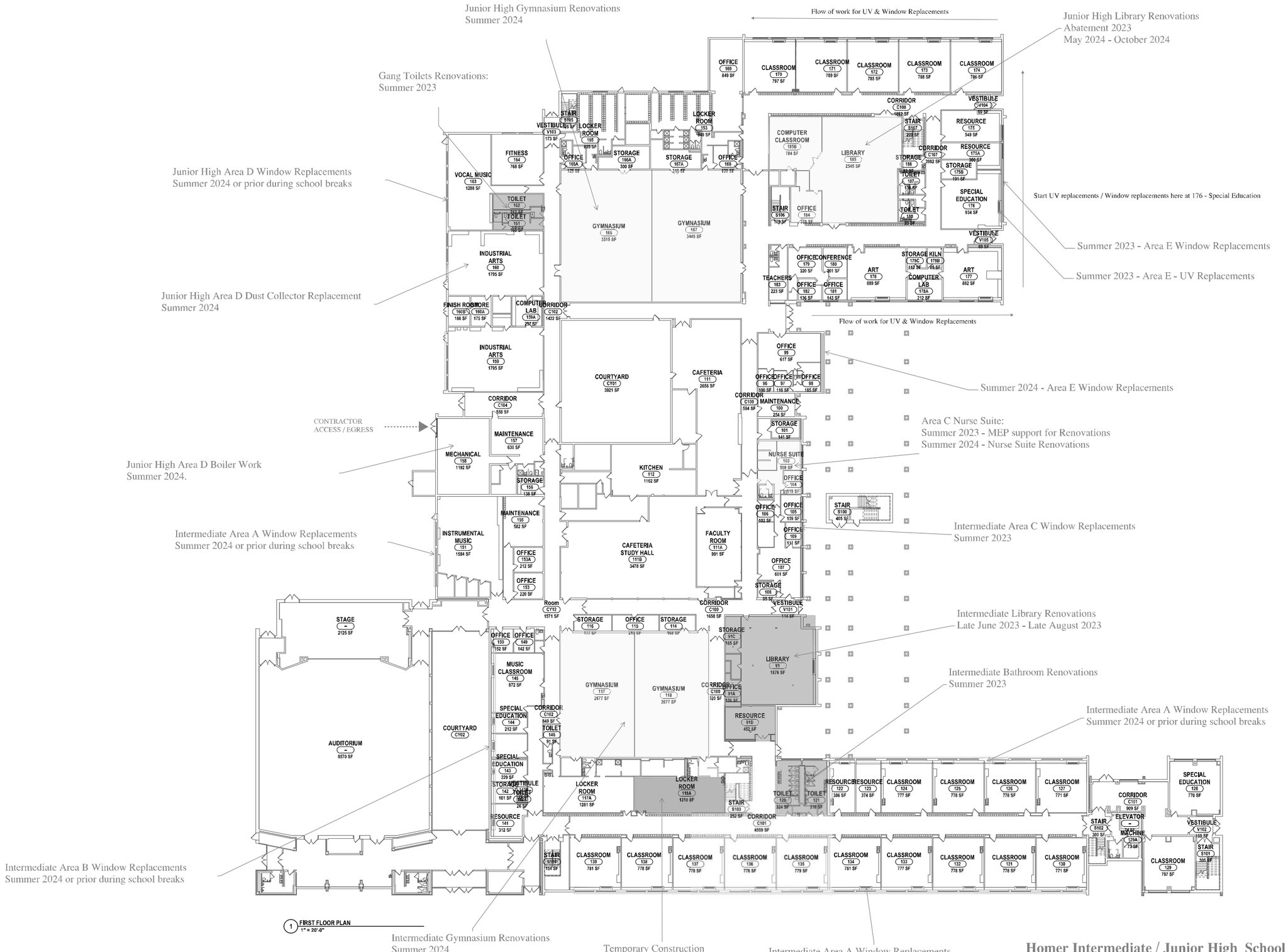
HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4868

ELEMENTARY SCHOOL SITE LOGISTICS PLAN
2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

ES-SL1

PROJECT NO: 2503.036

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001



Homer Intermediate / Junior High School 1st Floor Phasing Plan

DRAWN BY: LECHASE
CHECKED BY: JSB
DATE: 09/12/2022
SCALE:
REVISION:

"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4868

INTERMEDIATE & JR HIGH SCHOOL CM PHASING FIRST FLOOR PLAN
2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

IJ-CM1

PROJECT NO: 2503.036

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001

Area D - Home & Careers Renovations
Late June 2024 - Mid September 2024
2nd shift work to occur during building occupancy

Flow of work for UV & Window Replacements

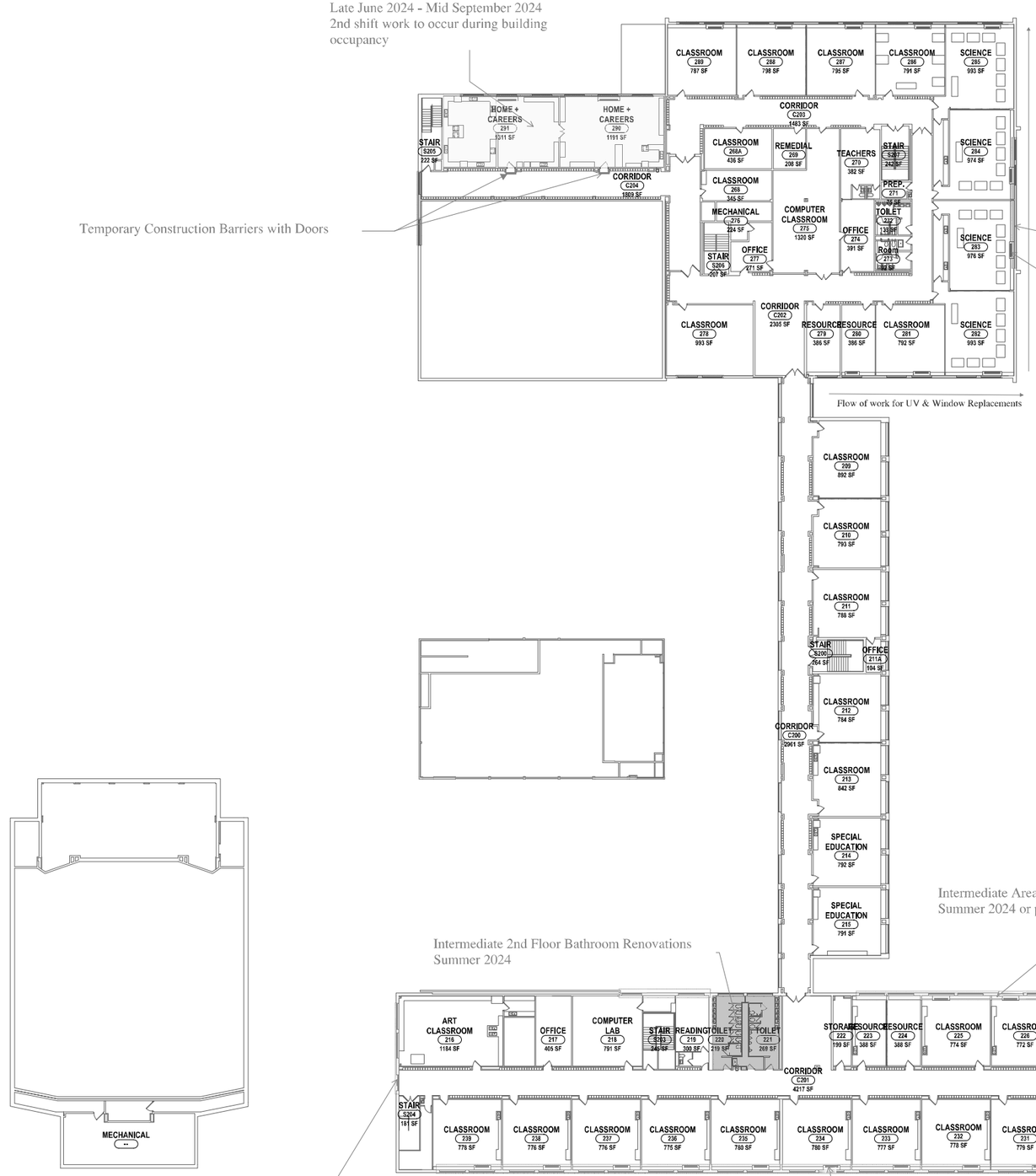
Temporary Construction Barriers with Doors

Start UV replacements / Window replacements here above 176 - Special Education

Summer 2023 - Area E Window Replacements

Summer 2023 - Area E - UV Replacements

Flow of work for UV & Window Replacements



Intermediate 2nd Floor Bathroom Renovations
Summer 2024

Intermediate Area A Window Replacements
Summer 2024 or prior during school breaks

1 SECOND FLOOR PLAN
1" = 20'-0"

Intermediate Area B Window Replacements
Summer 2024 or prior during school breaks

Intermediate Area A Window Replacements
Summer 2024 or prior during school breaks

Homer Intermediate / Junior High School
2nd Floor Phasing Plan

DRAWN BY:	LECHASE
CHECKED BY:	JSB
DATE:	09/12/2022
SCALE:	
REVISION:	

"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

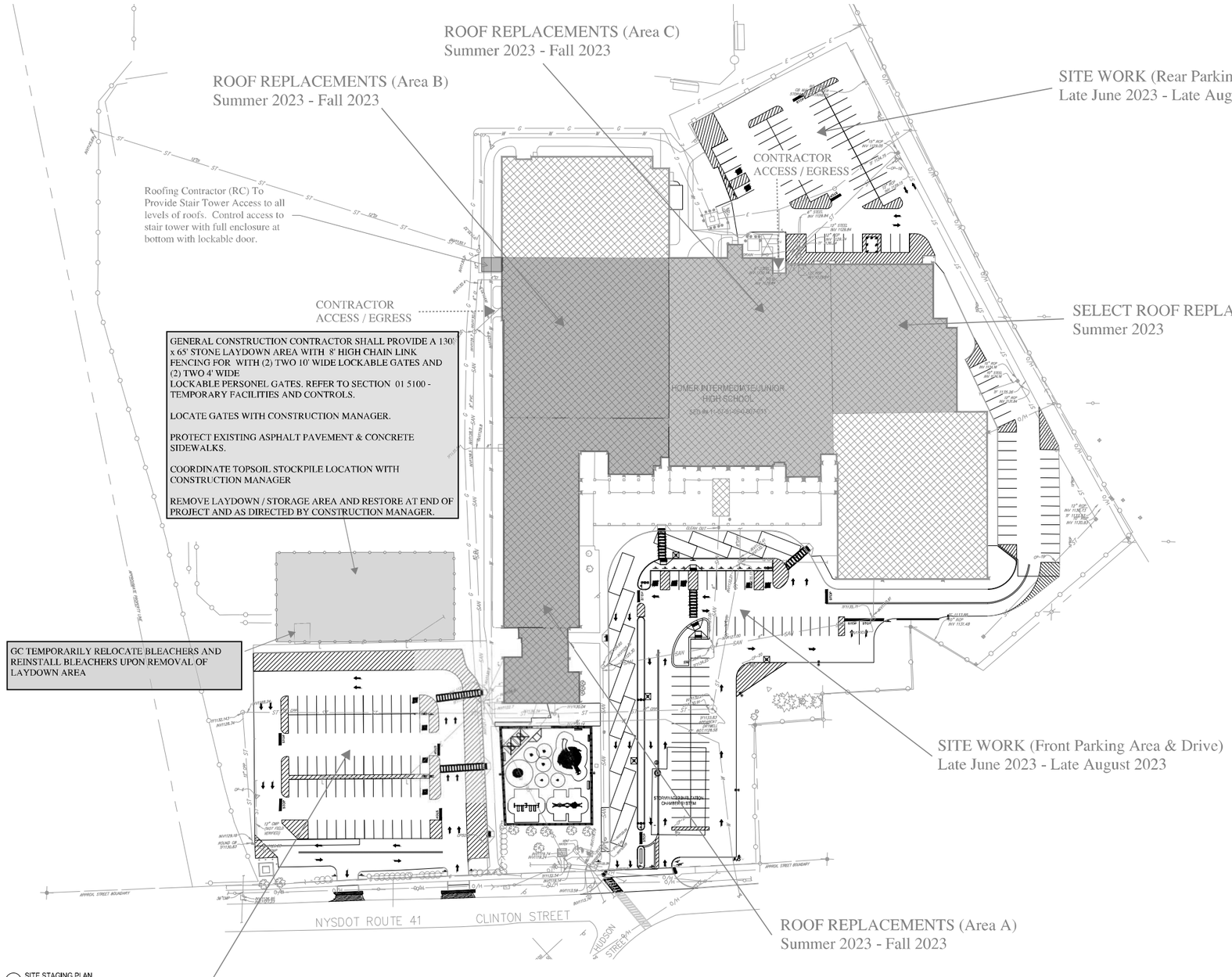
HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4868

INTERMEDIATE & JR HIGH SCHOOL CM PHASING SECOND FLOOR PLAN
2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

IJ-CM2

PROJECT NO: 2503.036

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001



1 SITE STAGING PLAN
SCALE: 1" = 30'

Homer Intermediate/Junior High School
Site Logistics Plan

SCALE IN FEET
0 20 40 80 120
SCALE: 1" = 40'

DRAWN BY:	LECHASE
CHECKED BY:	JSB
DATE:	09/12/2022
SCALE:	
REVISION:	

HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4868

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001

INTERMEDIATE & JR HIGH SCHOOL SITE LOGISTICS PLAN

2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

IJ-SL1

PROJECT NO: 2503.036

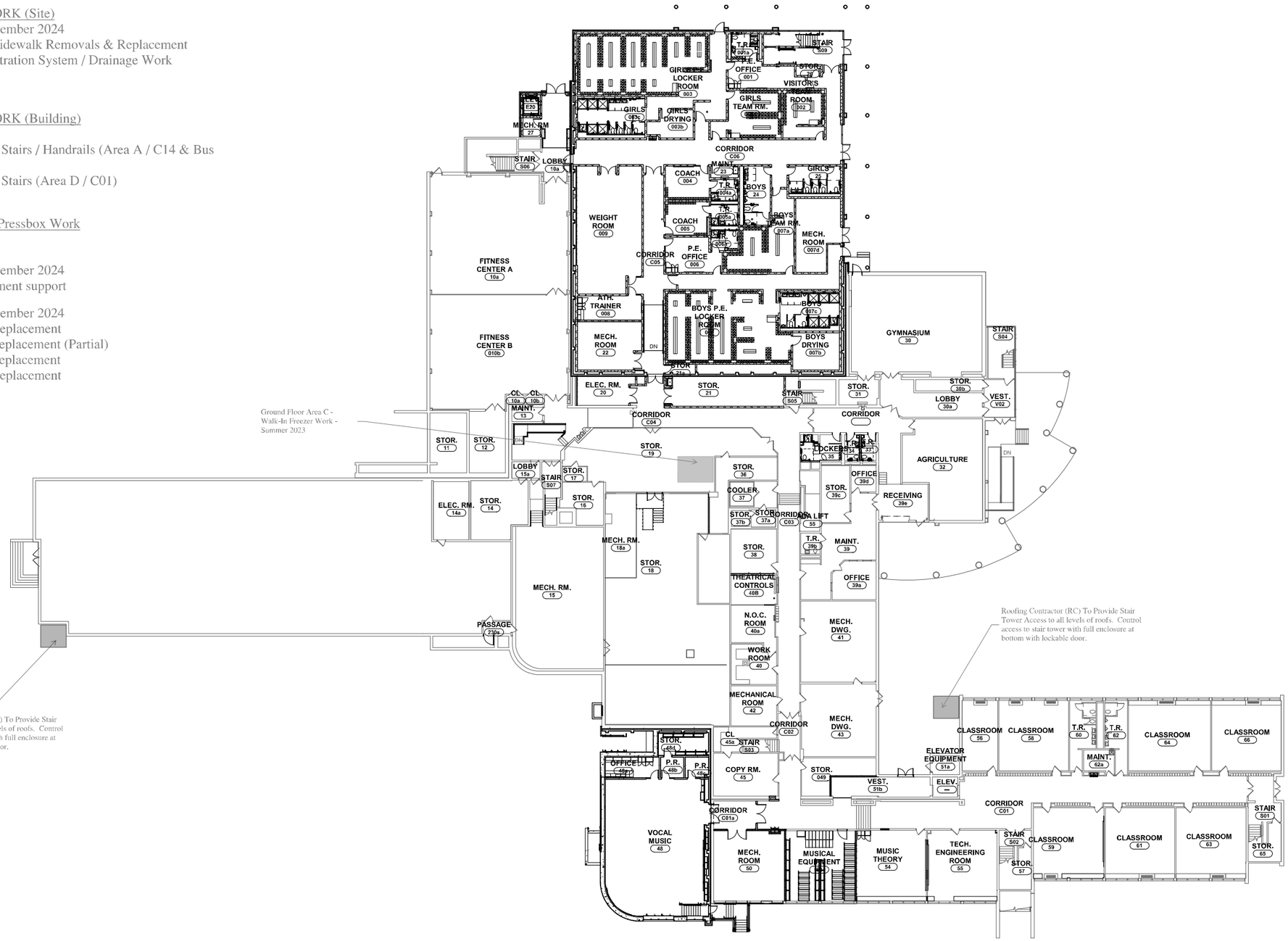
EXTERIOR WORK (Site)
June 2024 - September 2024
Parking Area / Sidewalk Removals & Replacement
Stormwater Infiltration System / Drainage Work
Site Lighting

EXTERIOR WORK (Building)
Summer 2023
Repair Concrete Stairs / Handrails (Area A / C14 & Bus Entry)
Repair Concrete Stairs (Area D / C01)

Summer 2024 - Pressbox Work

Roofing:
June 2024 - September 2024
- Rooftop equipment support

June 2024 - September 2024
- Area A Roof Replacement
- Area B Roof Replacement (Partial)
- Area C Roof Replacement
- Area D Roof Replacement



1 GROUND FLOOR PLAN
1/16" = 1'-0"

Homer High School - Phasing Plan

DRAWN BY:	LECHASE
CHECKED BY:	JSB
DATE:	09/12/2022
SCALE:	
REVISION:	

Copyright: 2022

"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

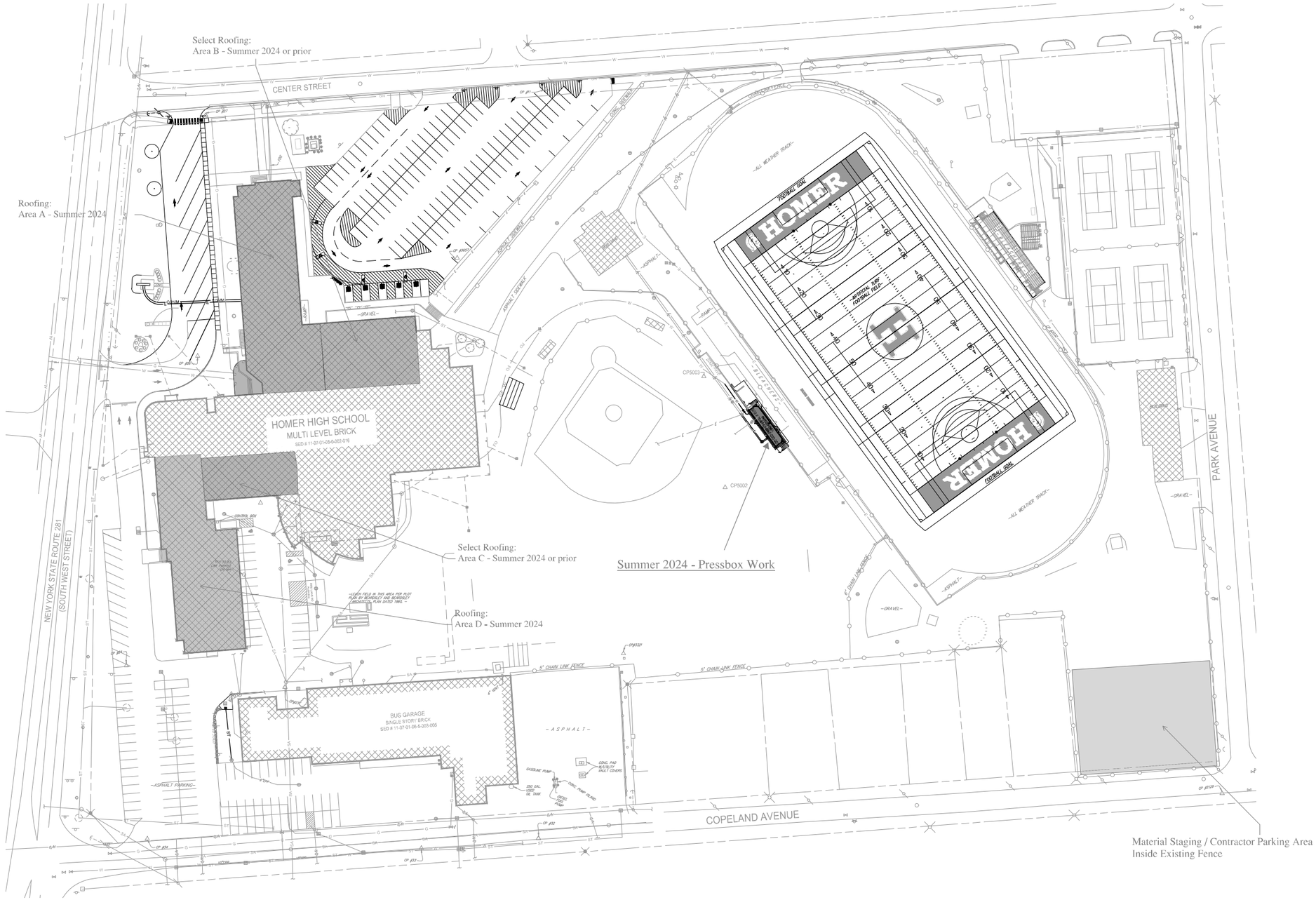
HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4668

HIGH SCHOOL CM PHASING PLAN
2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

HS-CM1

PROJECT NO: 2503.036

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001



1 SITE STAGING PLAN
SCALE: 1" = 40'

EXTERIOR WORK (Site)
June 2024 - September 2024
Parking Area / Sidewalk Removals & Replacement
Stormwater Infiltration System / Drainage Work
Site Lighting

EXTERIOR WORK (Building)
Summer 2023
Repair Concrete Stairs / Handrails (Area A / C14 & Bus Entry)
Repair Concrete Stairs (Area D / C01)

EXTERIOR WORK (Roofing):
June 2024 - September 2024
- Rooftop equipment support

Summer 2024
- Area A Roof Replacement
- Area B Roof Replacement (Partial)
- Area C Roof Replacement
- Area D Roof Replacement

N
SCALE IN FEET
0 20 40 80 120
SCALE: 1" = 40'

DRAWN BY:	LECHASE
CHECKED BY:	JSB
DATE:	09/12/2022
SCALE:	
REVISION:	

"IT IS A VIOLATION OF THE LAW FOR ANY PERSON TO MAKE UNAUTHORIZED ALTERATIONS OR ADDITIONS TO PLANS BEARING A LICENSED ENGINEER'S, ARCHITECT'S OR SURVEYOR'S SEAL."

HUNT ENGINEERS | ARCHITECTS | SURVEYORS
HORSEHEADS, NY 607 - 358 - 1000 ROCHESTER, NY 585 - 327 - 7950
TOWANDA, PA 570 - 265 - 4868

HIGH SCHOOL SITE LOGISTICS PLAN
2021 CAPITAL IMPROVEMENT PROJECT
HOMER CENTRAL SCHOOL DISTRICT
9 CENTRAL PARK PL., 80 S. WEST ST., 58 CLINTON ST., HOMER, NY 13077

HS-SL1

PROJECT NO: 2503.036

HIGH SCHOOL SED # : 11-07-01-06-0-002-016, INTERMEDIATE/ JUNIOR HIGH SCHOOL SED # : 11-07-01-06-0-007-013, ELEMENTARY SCHOOL SED # : 11-07-01-06-0-006-013, EXISTING PRESS BOX SED # : 11-07-01-06-7-015-003, NEW PRESS BOX SED # : 11-07-01-06-7-023-001

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the requirements for the submittals procedures.

1.3 SUBMITTAL REQUIREMENTS

A. Each Prime Contractor shall provide a Submittal register indicating submittals required for each section of the Specifications.

B. Digital copies of the Submittal register shall be provided to the Construction Manager with submittal date column filled in, indicating anticipated dates for submission of each submittal. Establish anticipated submittal dates after coordinating delivery lead times with the current Project Master Schedule. This register shall be completed and submitted before first Application for Payment will be approved. This register is required within fifteen (15) days of contract award.

C. Schedule all submittals to be completed within sixty (60) days after Contract execution unless otherwise specified. Indicate items requiring more than sixty (60) days with an explanation for the additional time and on what dates they will be submitted. The dates indicated for each submittal shall take into account the lead-time required for ordering and fabricating of the various items. It is the Contractor's responsibility to expedite submittals / product data as required to maintain the Construction Master Schedule.

1.4 PROCUREMENT LOG REQUIREMENTS

A. All Prime Contractors shall submit to the Construction Manager an "Equipment / Fixture Procurement Report" two (2) weeks after the Contractor is notified of award. The Contractor shall list all equipment items, which are being purchased, drawing submittals, samples, etc., for a complete composite report.

B. The report shall be resubmitted to the Construction Manager with updated information weekly until such time as the Construction Manager notifies the Contractor that only bi-monthly or monthly reports are required.

1.5 SHOP DRAWINGS

A. Original drawings, prepared by Contractor, Subcontractor, supplier or distributor, which illustrate some portion of the work showing fabrication, layout, setting or erection details.

1. Identify details by reference to sheet and detail numbers shown on shop drawings.
2. Sheet size, multiple of 8 1/2 X 11 inches, not to exceed size of contract drawings when unfolded.
3. Photographic reproductions of contract drawings will not be accepted as shop drawings and will be rejected.
4. Submittals traced or copied from Contract Drawings are not acceptable and will be returned without review.

1.6 PRODUCT DATA

A. Manufacturers catalog sheets, brochures, diagrams, schedules, performance charts and other standard descriptive data.

1. Modify product data to delete information that is not applicable to project.
2. Supplement standard to provide additional information applicable to project.
3. Clearly mark each copy to identify applicable materials, products or models.
4. Show dimensions and clearances required.
5. Show performance characteristics and capacities.
6. Show wiring or piping diagrams and controls.

1.7 SAMPLES

A. Physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.

1. Office samples to be of sufficient size and quantity to clearly illustrate:
    a. Functional characteristics of product or material, with related parts and method of attachment.
    b. Full range of color samples.

B. Field samples and mock-ups:
1. Erect at project site at location acceptable to the Construction Manager and Architect/Engineer.
2. Construct samples or mock-up complete, including work of all trades required in finish work.

1.8 CONTRACTOR RESPONSIBILITIES

A. Do not start, fabricate or install work requiring submittals until submittals meeting Contract Requirements have been returned to the Contractor.

B. In the event material and/ or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner’s Agent, this material and/ or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.

C. Review, stamp and sign shop drawings, product data and samples prior to submission to Architect through the Construction Manager.

D. Before release of fabrication or purchase, Contractor must verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and other data.

E. Coordinate each submittal with requirements of Work and Contract Documents.

F. Contractor's responsibility for mistakes and oversights in submittals is not relieved by the Construction Manager or Architect/Engineer's review of submittals.

G. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect/Engineer's review of submittals unless Architect/Engineer gives written acceptance of the specific deviations.

H. Notify the Construction Manager and Architect/Engineer in writing, at time of submission, of deviations in submittals from requirements of Contract Documents.

I. This Project shall utilize Procore, a web based data management program, for the submittal review process. LeChase will provide access for the use of Procore.
   1. The process for use of Procore shall be as follows:
      i. Prime Contractor shall upload PDF copy of submittal with cover sheet to File Management folder for the respective Prime Contractor.
      ii. LeChase shall enter the initial routing information into Procore and send notification to the Architect / Engineer.
      iii. Architect/Engineer shall review, comment, redline the submittal.
      iv. Once a submittal is found to meet the intent of the design, the reviewed submittal will be uploaded by the Architect/Engineer to the File Management folder for the respective Prime Contractor.
      v. LeChase will close out the submittal item in Procore following review by the Architect/Engineer.

1.9 SUBMISSION REQUIREMENTS

A. Schedule submissions to allow at least fifteen (15) working days for review. Large submissions may take longer.

B. For product data and shop drawings, submit digital copies.

C. Submit at least the number of samples specified in each technical section and no less than two (2) each, plus the number that Contractor needs returned.

D. Submittal Cover Sheet:

   2. Submittal cover sheets must be filled out completely and attached to each copy of all submissions. Submissions without the Submittal Cover Sheet will be returned without review. Refer to Section 00 85 20 Forms.

E. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.
      a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

F. Submittals shall be bound adequately so as to remain in tact during use in jobsite environment, and shall be indexed with labeled dividers if they include more than one product or material.

G. Submissions shall include:

   1. Date and revision dates.
   2. Relationship to all adjacent structure or materials.
   3. Field dimensions, clearly identified as such.

4. Applicable standards.
5. Notification and identification of deviations from Contract Documents via cover letter and clear markings on the submission.
6. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.
7. Submittals without Contractor's stamp will be returned without being reviewed.
8. Additional pertinent data.
9. Work or item represented by submittal.

H. Should additional copies be required, Contractor shall make required copies for distribution of shop drawings and product data that have been stamped and signed by the Architect/Engineer.

I. Submittals shall be identified by reference to drawing numbers, detail numbers, schedule numbers, room numbers, and identification systems used in the Contract Documents.

J. All items that require color selection shall be submitted as soon as possible. The Architects' review and coordination of color selections cannot be completed until all items are submitted.

K. Submissions that are incomplete due to lack of Contractor's approval, lack of proper identification, incorrect number or type of submittal items or similar reasons shall be returned without action for correct submission.

1.10 RESUBMISSION REQUIREMENTS

A. Shop Drawings

1. Revise initial drawings as required and resubmit as specified for initial submittal.
2. Indicate on drawings changes that have been made other than those requested by the Architect/Engineer.

B. Product Data and Samples: Submit new data and samples as required for approval.

1.11 CONTRACTOR'S DISTRIBUTION OF SUBMITTALS

A. Distribute full size copies of shop drawings and any product data which carry an Architect/Engineer stamp to:

1. Contractor's Subcontractors and Suppliers, as required for coordination.
2. Other Contractors for coordination purposes.
3. Construction Manager.

1.12 ARCHITECT/ENGINEER

A. Review by the Architect will be for conformance to design intent, materials, and general dimensions, but shall not relieve any Contractor of their responsibility for furnishing proper equipment or materials nor for undetected errors in the drawings, unless attention to same is noted in writing at the time of submission of Drawings. Review of shop drawings does not relieve Contractor of responsibility for proper fit, not detail design of connections nor for supplying all necessary material or quantities.

B. Review of separate items does not constitute review of an assembly in which item functions.

C. Stamp and initial or sign to indicate review of submittal.

SECTION 01 33 00
SUBMITTAL PROCEDURES

D. Route submittal to the Construction Manager through Procore Workflow.

E. Do not permit submittals marked "Revise and Resubmit" to be used at the Project site, or elsewhere where work is in progress.

1.13 ADDITIONAL INSTRUCTIONS

A. The Construction Manager may from time-to-time issue additional instructions to the Contractor as may be necessary to amplify, augment, modify or clarify the Contractor Documents. These may be in the form of drawings, Specifications, interpretations, orders and supplemental agreement, Change Order or minor change. Submittals shall be resubmitted and otherwise kept up to date as required by additional instructions.

END OF SECTION

SECTION 01 33 29.07

PROHIBITED CONTENT INSTALLER CERTIFICATION

PROJECT NAME: 2021 CAPITAL IMPROVEMENT PROJECT; NO.: 2503-036.

USE OF THIS FORM

1.1 BECAUSE INSTALLERS ARE ALLOWED AND DIRECTED TO CHOOSE ACCESSORY MATERIALS SUITABLE FOR THE APPLICABLE INSTALLATION, THERE IS A POSSIBILITY THAT SUCH ACCESSORY MATERIALS MIGHT CONTAIN VOC CONTENT IN EXCESS OF THAT PERMITTED, ESPECIALLY WHERE SUCH MATERIALS HAVE NOT BEEN EXPLICITLY SPECIFIED.

1.2 CONTRACTOR IS REQUIRED TO OBTAIN AND SUBMIT THIS FORM FROM EACH INSTALLER OF WORK ON THIS PROJECT.

1.3 FOR EACH PRODUCT CATEGORY LISTED, CIRCLE THE CORRECT WORDS IN BRACKETS: EITHER [HAS] OR [HAS NOT].

1.4 IF ANY OF THESE ACCESSORY MATERIALS HAS BEEN USED, ATTACH TO THIS FORM PRODUCT DATA AND SDS SHEET FOR EACH SUCH PRODUCT.

1.5 VOC CONTENT RESTRICTIONS ARE SPECIFIED IN SECTION 01 61 16.

PRODUCT CERTIFICATION

2.1 I CERTIFY THAT THE INSTALLATION WORK OF MY FIRM ON THIS PROJECT:

A. [HAS] [HAS NOT] required the use of ADHESIVES.

B. [HAS] [HAS NOT] required the use of JOINT SEALANTS.

C. [HAS] [HAS NOT] required the use of PAINTS OR COATINGS.

D. [HAS] [HAS NOT] required the use of COMPOSITE WOOD or AGRIFIBER PRODUCTS.

2.2 ___ LIST OF PRODUCTS OF THESE TYPES THAT WERE USED IS ATTACHED, WITH MANUFACTURER AND BRAND NAME.

2.3 ___ PRODUCT DATA AND SDS SHEETS FOR THESE PRODUCTS:

A. ___ Are attached.

B. ___ Were submitted as normal submittals.

C. ___ Were submitted as sustainable design submittals using the Material Content Form.

CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)

3.1 FIRM NAME: _____

3.2 PRINT NAME: _____

3.3 SIGNATURE: _____

3.4 TITLE: _____ (OFFICER OF COMPANY)

3.5 DATE: _____

END OF SECTION

SECTION 01 34 10
CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Contractor shall comply with Owner occupancy, public use, and phasing requirements.

B. Contractor shall limit his use of the premises for work and for storage, to allow for:
   1. Work by other Contractors
   2. Owner occupancy
   3. Public use

C. Contractor shall limit their operations including storage of materials and prefabrication to areas within the Contract Limit Lines unless otherwise permitted by the Construction Manager at the Owner's option.

D. Contractor shall coordinate the use of premises with the Owner and Construction Manager and shall move, at his own expense, any stored products under Contractor's control, including excavated material, which interfere with operations of the Owner or separate contractors.

E. Contractor shall obtain and pay for the use of additional storage or work areas needed for operations.

F. Contractor shall assume full responsibility for the protection and safekeeping of Products under this Contract stored on the site and shall cooperate with the Construction Manager to ensure security for the Owner's property.

G. The contractors shall take all measures necessary to protect the existing landscaping in and around the construction site. No alterations of any kind to trees scheduled to remain will be permitted.

H. In the utilization of ground area, each Contractor shall protect pavement, curbs, walks, structures, and other permanent components that are designated to remain and shall maintain such protection. Any damage to the area used shall be repaired and/or restored to previous condition by the responsible contractor.

I. Each Contractor and their Subcontractors, material suppliers and fabricators shall provide full and free access for the Owner's Representative, Consultants and/or other designated representatives of the Owner to inspect job materials, equipment, fabrication facilities and storage locations, both at and away from the job site.

J. Work in Owner occupied spaces shall be restricted to essential activities. Such activities shall be scheduled in advance with the Construction Manager and Owner.

1.2 AREA AVAILABLE FOR CONTRACTOR'S USE

A. The Contractor shall confine its operations to those portions of the Owner's property, and to the right-of-ways or easements, temporary or permanent, acquired or designated for the work of the Contract as shown on the Drawings.

B. Private property adjacent the site shall not be entered upon or used by the Contractor for any purpose without the written consent of the Owner thereof. A copy of such consent shall be filed with the Construction Manager prior to the start of work.

SECTION 01 34 10
CONTRACTOR USE OF PREMISES

C. Only project managers and field superintendents will be permitted to park within the construction fence.

END OF SECTION

SECTION 01 34 20
SITE CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the site condition requirements without limiting the generality implied by the Specifications and Drawings. Refer to Section 01 10 00 for summary / scope of work.

1.3 PRE-BID INSPECTION & EXAMINATION

A. The Contractor warrants and represents that prior to submitting his Bid, that they are satisfied as to the location and nature of the work and the quantity, quality, type and nature of both surface and subsurface structures and materials likely to be encountered.

1.4 BORINGS

A. Any data on subsurface conditions that may have been obtained by the Owner prior to the advertisement for bids, through test borings, test pits, seismic explorations, or other means, was obtained by the Owner for its sole use and purpose. Any such data, known or recalled as of the date of Advertisement or Notice for Bids, are shown on separate drawings or in separate schedules and reports which are not any part of the Contract Documents. All such data are made available to Bidders, the Contractor, and other interested parties only as a convenience and without express or implied representation, assurance or other guarantee that any of the information is complete, correct, adequate, or representative of a true or typical picture of subsurface conditions on the site.

B. The Contractor, both during its status as Bidder and after execution of the Contract, shall satisfy themselves as to the nature, character, quality, and quantity of above ground and below ground conditions likely to be encountered. Any reliance on data made available by the Owner shall be at the Contractor's sole risk.

C. No claim whatsoever shall be made by the Contractor against the Owner or Construction Manager for or on account of such data available, or neglected to be made available, by the Owner or Construction Manager.

D. The Contractor at any time, and any holder of Bidding Documents during the period between advertisement for and receipt of bids, will be permitted to make test borings, test pits, soundings or similar subsurface investigations on the Site. Prior to making these investigations the Contractor and/or holder of Bidding Documents must notify the Construction Manager when and where they propose to make such investigations.

E. The locations where test boring samples may be examined, if any, is given in the Subsurface Exploration and Geotechnical Evaluation Report.

1.5 PROTECTION OF EXISTING STRUCTURES

A. The Contractor shall at all times have onsite, suitable and sufficient plant and materials to adequately protect, support and sustain any and all existing structures and facilities, whether above or below ground, and shall use same as may be necessary or required to protect, support

and sustain any and all such structures as may become weakened, endangered, undermined, or uncovered.

B. The Contractor shall, at its own expense, support and sustain in their places and protect from direct or indirect damage all water, gas, steam, air or other mains or pipes, sanitary and storm water sewers and drains, conduits, subways, service connections, buildings, poles, wires, fences, pavements, sidewalks, curbs, railways, trees and other structures and property and appurtenances thereto on or in the vicinity of the site, and shall assume all liability for damage thereto, including damage arising out of settlement or lateral movement of walls of excavations, whether occurring during performance of the work or the 12-month period of guarantee.

C. In the event of damage or danger to any structure or facility, the Contractor shall immediately notify the Construction Manager, and shall promptly repair or protect the structure, at its own expense, as the Construction Manager may direct.

1.6 EXISTING STRUCTURES BELOW GROUND

A. The Contract Drawings show the location and character of certain existing subsurface structures and facilities likely to be encountered in excavations or located in such proximity to the work as to require precautions for their protection. The sizes, materials, locations and depths shown are only approximate, and the Contractor shall satisfy itself as to the accuracy and completeness of such information. The Contractor shall not be relieved from any of its obligations, nor be entitled to claim for damages or additional compensations, sustained or arising out of inadequacy or inaccuracy of the information given.

1.7 ABANDONED STRUCTURES

A. Any structures, facilities or appurtenances therefore which are abandoned or become so by reason of the work, shall, at the Contractor's expense, be broken up and filled with approved material, if directed by the Construction Manager.

1.8 LATENT SUB-SURFACE CONDITIONS

A. In the event that latent sub-surface conditions are found to materially differ from those on which the plans and Specifications are based, the Contractor shall immediately notify the Construction Manager before they are disturbed. After prompt investigation, the Architect/Engineer will determine what changes, if any, should be made in the Plans and Specifications because of the revealed conditions, and shall advise the Construction Manager.

1.9 ADJUSTMENT OR CHANGES OF EXISTING STRUCTURES

A. If an underground pipe or other structure requires realignment or relocation not included in the Plans or Specifications, the Architect will issue a clarification and the Construction Manager will issue a Change Order for such work, and the Contractor shall be compensated. The Contractor shall strip or uncover and support or sustain the structure at its own expense prior to such Change Order, as part of its work under the original Contract, and shall not be entitled to claim for damage or delay due to its presence or discovery.

B. Wherever existing utilities comes within limits of the work; the Contractor shall notify both the Construction Manager and the Utility before in any way disturbing it. Any work of realignment, relocation, removal or extension of the utilities shall be done as mutually agreed by the Utility, the Contractor and the Architect. The Contractor shall maintain satisfactory drainage of the excavation at all times from revelation of the structure until completion of its realignment or readjustment. Interruption of service by utilities shall be kept to a minimum. Prior to interruption, Contractor to

notify Owner/Construction Manager of precise condition, and provide a brief event schedule outlining procedures and anticipated times of delays.

C. The Contractor shall not cause nor permit interference with or hindrance to any municipal department, individual, public service corporation, or other company in protecting its structures and facilities, nor in removing, replacing or relocating it.

1.10 NOTIFICATION OF OTHER PARTIES

A. In addition to notices to Utilities and others required elsewhere herein, the Contractor shall give written notice of its proposed construction operations to the owner of all public and private utilities at least seven days in advance of breaking ground in any area in which a utility is located. Copies of each such notice shall be simultaneously sent to the Construction Manager.

END OF SECTION

SECTION 01 34 30
PROJECT PROCEDURES FOR RENOVATIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

B. Specification Section 01 51 00 – Temporary Facilities

1.2 SUMMARY

A. This Section includes the requirements for the project procedures during renovations and phased construction.

1.3 MAINTENANCE OF BUILDING CIRCULATION AND EXITS

A. Contractor shall maintain circulation corridors, exits and stairs in all building areas occupied by Owner or Public. The existing buildings will remain operational and open to the public during portions of the work.

B. Where temporary emergency egress from Owner occupied areas through construction areas are required; those areas shall be adequately protected to ensure the safety of occupants through the construction areas. This would include but not limited to protective – covered walkway through the construction area. It shall be the responsibility of the General Construction Contractor to provide this protection as directed by the Construction Manager.

C. All construction areas shall be securable by lock and key. If the construction areas are means of emergency egress from the construction area or means of egress from the Owner occupied areas through construction areas; the doors shall swing outward in the direction of egress. These doors shall be provided with “panic” hardware installed in a manner to allow egress outward from the building, but upon closing of the door prevent unauthorized entry into the building. Contractors shall anticipate that these barriers and protective items will need to be modified and adjusted during the course of construction and shall include these changes as part of their Base Bid.

D. All Contractors shall cooperate with the Owner with respect to security of the building and the rules that they have developed to maintain security. This would include but not be limited to keeping doors locked all the times to prevent unauthorized entry into the construction area or into the Owner’s occupied areas. The Contractor shall not admit entrance into the existing facility or the construction area any person not associated with the construction project. All patrons, staff and visitors shall enter the building through designated entrances as established by Owner and/or Construction Manager. All construction personnel shall enter the construction area and/or the existing facility at entrances designated by the Construction Manager.

1.4 TEMPORARY CONTAINMENT PARTITIONS

A. Temporary dust containment partitions will be provided in accordance with Section 01 51 00 – Temporary Facilities to isolate all areas of construction work from occupied portions of existing buildings to prevent the spread of dust, odors and noise.

B. The work areas shall be maintained at a negative pressurization with respect to adjoining occupied areas. For the purpose of dust and contaminant isolation from occupied areas, containment partitions shall be air tight and capable of maintaining the construction areas

negatively pressurized with respect to the occupied areas. Non-air tight construction barriers will not constitute acceptable containment partitions.

C. In the event a failure of a containment barrier during the course of work, when directed by the Construction Manager or the Indoor Environmental Consultant, Contractors shall cease work in the potentially affected area until the containment barrier failure is corrected and acceptable pressurization is restored and verified.

PART 2 - PRODUCTS

2.1 REMOVED MATERIALS AND EQUIPMENT

A. General:

1. All materials and equipment to be removed as part of the work shall become the property of the Contractor and be removed from the jobsite at the Contractor's expense unless otherwise shown on the drawings or specified.
2. When debris is transported through occupied areas of the existing building, receptacles shall be sealed and covered to eliminate the spread of dust and debris.

B. Items Retained by Owner:

1. The items that remain the property of the Owner after removal by the Contractor will be listed in each Contract or indicated on the drawings.
2. These items shall be carefully removed by the Contractor without damage and turned over to the Owner.

C. Items Re-Used As Part of the Work:

1. Items indicated to be re-used shall be carefully removed and stored by the Contractor until such time as they may be reinstalled.
2. Items removed by others and indicated to be reinstalled per the Contract Documents are to be coordinated with the Construction Manager for pickup.

END OF SECTION

SECTION 01 34 40
WORK UNDER SPECIAL CONDITIONS

PART 1 - DESCRIPTION

1.1 WORK AFTER DARK

A. Unless specifically required elsewhere herein, no contractor shall perform exterior work after dark except in emergencies. When time permits, a contractor shall inform the Construction Manager in advance of such work and shall obtain approval. When time does not permit advance notice to the Construction Manager, they shall inform the Construction Manager at the earliest possible moment.

B. The placing of concrete shall be so scheduled as to be started early enough in daylight hours to allow sufficient time for the completion of the section under construction before dark, including the work of finishers.

C. When, in order to minimize interference with existing structures or utilities, or maintain traffic, it may, in the opinion of the Construction Manager, be expedient or necessary to do work after dark, such work shall be performed by the Contractor at no additional cost to the Owner, and the Contractor shall provide adequate lighting.

D. Nothing in this section shall preclude any contractor from working on the interior of the building after dark, as long as sufficient electric lights exist in the area of the work.

1.2 SATURDAY/OVERTIME/SHIFT WORK

A. Each Contractor shall provide at all times sufficient manpower to maintain the progress of the Work to the satisfaction of the Construction Manager and/or the Owner. The option to work extended hours and weekends with prior agreement with the Construction Manager may be made available to meet the schedule. Costs for premium time shall be borne by each individual Prime Contractor.

B. No Saturday or overtime work shall be scheduled or performed by Contractors without prior approval by the Construction Manager. Proposed work schedule shall be submitted to the Construction Manager a minimum of 24 hours prior to proposed start unless otherwise directed or approved by Construction Manager.

C. Because of performing work in an occupied building, it will be necessary for contractors to work night shifts, this is expected and encouraged. Any contractor(s) that want or find it necessary to work night shifts in order to complete the work as scheduled, should contact the Construction Manager 24 hours in advance of when the contractor(s) want to start the night shift. The Construction Manager will make every effort to schedule this night shift work with the Owner and activities that take place in these buildings at night. Other hours can be scheduled with the approval of the Construction Manager and the Owner. Any Contractor that does work a night shift shall be responsible to:

1. Maintain security of the building at the end of the night shift by insuring that all windows and doors are closed and locked.
2. Maintain security in the building by not allowing anyone other than its own work force to enter the building
3. Insure that the work area is usable for its intended purpose for the next days use by the Owner. This includes that all Life/Safety Systems are in place and functioning, that all other systems are functioning properly and usable, the areas can be occupied, and all construction debris, dust, materials and tools are removed.

4. Cooperate and coordinate night shift activities with the Owner's maintenance/custodian staff that is on duty.

1.3 WORK ON SUNDAYS OR HOLIDAYS

A. No Contractor shall work on Sundays, or locally recognized legal Holidays, except in an emergency, and then shall confine its operations to only the work considered necessary to be performed at such time. In the event of an emergency, Contractor shall notify the Construction Manager the same day or as soon as possible.

1.4 LABOR REQUIREMENTS

A. With all of the above items, each Contractor shall secure the necessary or required paperwork and approval of the NYS Department of Labor and applicable Trade Unions prior to commencing work under these conditions.

1.5 WORK IN STORMS

A. If required by the Construction Manager, masonry work, and the mixing and placing of concrete shall be halted during rainstorms, and all fresh work shall be immediately protected with suitable coverings. The Contractor shall keep a sufficient quantity of such coverings at the site at all times.

B. No paving, exterior painting, fine grading, seeding or roofing shall be done during rain or snowstorms.

C. All roof deck shall be watertight at the end of each day. Contractor shall only remove what they can replace that same day.

D. Because this project exists where snow storms can occur, the Construction Manager along with the Owner will work out a system where construction personnel will be notified if the contractors and their personnel are not to report for work because the construction site is closed, the roads to the building are closed, or if it is just too dangerous for construction personnel to report for work. As part of this notification system it will also advise construction personnel when they need to leave the project because of an impending snowstorm. The Contractors and their personnel are to abide by the notifications for their own safety and the safety of others. The contractors will not be due any additional compensation if it is deemed the project is closed due to weather or if they are sent home because of impending weather.

1.6 WORK IN COLD WEATHER

A. Certain Specifications contain provisions prohibiting the performance of certain work in cold weather or outlining the conditions under which such work may be so performed. In the absence of specifics mentioned elsewhere in the Contract Documents, the judgment of the Construction Manager shall govern in any case where temperature may adversely affect or prevent the performance of quality work. Contractor(s) will not be due any additional compensation if the work is stopped due to weather.

END OF SECTION

SECTION 01 35 17
ALTERATION PROJECT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Requirements for protection of existing facilities.

B. Demolition and removals.

C. Cutting and Patching Requirements

D. Hazardous materials procedures.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements.

B. Section 01 50 00 - Temporary Facilities and Controls.

C. Section 07 84 00 - Firestopping.

1.3 SUBMITTALS

A. Comply with requirements of Section 01 30 00 as modified below:
   1. Submit Samples of all materials used in patch to match work, specifically ceramic tile, quarry tile, terrazzo, grout, glazed block, ground face block, brick, faux finishes, fabrics, vct, carpet, stained finishes, and any other material deemed necessary by the Architect to ensure appropriate matching of existing finishes.
   2. Submit written explanation of “cutting and patching” procedures when construction means and methods deviate from standard industry practices. At a minimum provide the following:
      a. Describe extent of cutting and patching, and methods to be used.
      b. Products to be used.
      c. Utilities that will be affected.
      d. Details and Engineering calculations when structural members will be affected either by adding reinforcement or altering the structural member.

1.4 DEFINITIONS

A. "Cutting and Patching” – The process of “opening up”, or “exposing” new or existing construction to facilitate the coordination of work, the installation of new work, the testing or inspection of work or building components, and the subsequent “closing up” or “restoration” of affected area back to it’s original condition.
   1. Cutting: Physical modification of construction work, both new and existing, or removal of existing or installed materials necessary to permit installation or performance of other work, including but not limited to; cutting, drilling, core-drilling, chopping, excavating, saw-cutting, trenching, backfill and compaction and other similar operations.
   2. Patching: Restoration, replacement and installation of construction material, new and existing, required to restore surfaces to original conditions and maintain fire rated assemblies after installation of other work.

1.5 PROTECTION OF EXISTING FACILITIES

A. Responsibilities of Each Prime Contractor

1. Provide and maintain protective measures required to prevent damage to existing facilities and to protect workmen and public, including protective construction required by applicable state and municipal laws, OSHA regulations, Contract Documents, site conditions, and as considered normal for operations involved in the work.
    a. Construct protective measures of types and materials that provide required protection continuously.
    b. Remove protective measure only when need for protection no longer exists.
    c. Provide additional protection as directed by Construction Manager.
2. Roof Protection: During operations on existing or newly-constructed roofs, provide protection for roof in work area in adjacent roof areas.
    a. Where construction operations on roof require removal of existing roofing system, apply roof protection to roof areas adjacent to work area and to approved access routes to work area.
    b. Where construction operations on roof do not required removal of existing roofing system, apply roof protection to all roof areas in work area and to approved access routes to work area.
    c. Limit traffic on roof to protected areas.
    d. Strictly comply with roof protection recommendations of agency, or agencies, holding bond, guarantee, or warranty in force for existing roof; however, if such recommendations are not available, provide minimum protection as follows:
        1) Minimum 1 layer of 1/2" exterior grade plywood laid over existing roof with 1 layer of 1/8" asphalt saturated protection board on top of plywood.
        2) On loose-laid elastic sheet roofing systems with stone ballast, remove existing ballast from area to receive protection, and apply minimum 6 mil. thick polyethylene sheeting over exposed membrane before laying plywood, unless otherwise recommended by roofing system manufacturer.
    e. Where roofing is cut to permit new construction, provide temporary roofing, temporary curbs, temporary coverings, and similar measures to prevent entrance of water. Refer to Section 01 50 00 - Temporary Facilities and Controls. Remove minimum amount of existing roofing and insulation required to accomplish new construction.

B. Damage to Existing Construction
1. Each Prime Contractor shall be responsible for damage to existing and newly installed construction caused by his, or his subcontractor's personnel and he shall repair, replace, or restore damaged construction immediately without additional cost to Owner.
    a. If Prime Contractor fails to immediately make efforts to repair, replace, or restore damaged construction, Owner may, after due notice, accomplish required repair, restoration, or replacement in accordance with provisions in General Conditions.
    b. Reimburse any other Prime Contractor for additional cost resulting from failures described above.
    c. The Owner will make no additional payment to the Contractor for additional work resulting from failures described above.
    d. When damage to existing facilities occur and Contractors do not admit to damage the Construction Manager will research to find responsible party. If party cannot be determined all trades will share the cost of appropriate repairs to return the damaged area to original condition.
2. Provide work required to repair, reconstruct, or replace existing construction due to failure of protective measures provided or due to failure of Prime Contractor to provide adequate protective measures.
    a. Coordinate all repair, replacement, or restoration activities through the Construction Manager.
    b. Patch damaged surfaces and refinish to match existing surfaces as required or as directed by Construction Manager.

1.6 DEMOLITION AND REMOVALS

A. Responsibility for Demolition and Removals
   1. Each Prime Contractor shall provide cutting and patching of existing surfaces disturbed by the work of their contract unless noted to be provided by another contract.
   2. Each Prime Contractor shall make provisions for removal, demolition, or disconnection of existing construction, equipment, and similar items as required for completion of his contract as shown in the Contract Documents, or encountered during the Project.
      a. Coordinate requirements for removal, disconnection, or demolition with other Prime Contractors.
      b. Remove all related items not shown or specified as required to complete removals shown on Drawings, including but not limited to insulation, hangers, supporting construction, and similar items. Consult Architect for instructions when such removals involve removal or cutting of structural components.
   3. Equipment removal:
      a. Owner shall remove furniture and small loose equipment, unless otherwise specified. Review removals with Owner prior to beginning demolition and removals.
      b. Prime Contractor requiring work shall remove, relocate, and reinstall existing equipment, built-in cabinets, casework, and similar items, including disconnection and capping of utility connections at existing location unless noted to be provided by others.
         1) Connection of utilities at new locations shall be by trade that would normally have installed the item.
         2) Comply with requirements for "Disposal of Removed Materials" below for equipment designated to be turned over to Owner.
      c. All existing fixtures and equipment, regardless of their nature, scheduled for removal and reinstallation in current or new location, shall be thoroughly cleaned to the condition expected in a normal, commercial building cleaning and maintenance program, including incidental construction dust during storage, immediately prior to reinstallation. Such reinstalled fixtures and equipment shall further be subject to Final Cleaning Procedures outlined in other specification sections, prior to Substantial Completion.

B. Verification of Conditions: Each Prime Contractor shall be responsible for visiting the site and building, studying the Drawings, making his own determination as to items and quantities of demolition and removal required, and including required demolition and removals in his bid.
   1. Additional payment will not be made on claims resulting from incomplete estimate of demolition or removals by Prime Contractor.
   2. Any definition of scope of demolition and removals within Contract Documents is intended to establish general limits and responsibilities for demolition and removal work.
      a. Where details in Construction Documents indicate a typical situation requiring demolition or removals, consider such situation to apply to similar conditions throughout and make required demolition or removals.
      b. Verify exact locations of existing piping shown on Drawings.
      c. Check load bearing function of walls and partitions before starting removal.

C. Concealed Conditions
   1. Where structural items, piping, conduit, or other items are exposed during demolition whose function is unknown, notify Architect and await instructions before proceeding with removal.
   2. Where exact locations of existing piping differs from locations shown on drawings, modify indicated connections, relocations, and deletions as required by project conditions, including necessary extensions with new piping to nearest approved point of connection.

D. Safety: Carefully perform demolition and removals in such manner to insure safety in handling and to prevent damage to construction and materials indicated to remain.

1. Provide shoring, bracing, and other temporary measures as required to maintain safe conditions, including structural safety of building.
2. Provide rigging, hoists, cutting equipment, and similar items required for demolition and removals.

E. Removal of existing ceilings: where existing ceiling finish is scheduled for removal, include existing suspension system in suspended ceiling systems, existing gypsum backer boards in adhesive-applied acoustical tile installation, and other ceiling system components as applicable.

F. Disposal of removed materials
1. Materials, fixtures, and equipment requested by Owner while still in place, or before removal from site, shall be left on site in location designated by Owner. Itemize in memorandum of transmittal, and obtain receipt from Construction Manager for all such items.
2. Carefully remove and store in protected locked location items noted in contract documents and items designated to be turned over to Owner until they can be relocated and reinstalled.
   a. Where storage in protected, locked location is not possible, provide proper protection against weather and damage by suitable temporary enclosures.
   b. Items damaged or lost during removal or storage shall be replaced in kind and quantity, at expense of responsible prime contractor.
3. Materials, fixtures, and equipment not designated to be reinstalled, relocated, or turned over to Owner and all waste materials and debris shall be promptly removed to dumpsters and legally disposed of.
   a. Materials or fixtures suitable for re-use may be used in temporary structured or partitions only.
   b. No removed materials, fixtures, or equipment items shall be reused in permanent structure, unless specified in contract documents.

1.7 CUTTING AND PATCHING

A. Unless otherwise noted, each Contractor shall be responsible for all cutting and patching, required in conjunction with the work of their contract and to:
1. Be familiar with all the Contract Documents, including other trades, to determine the extent of the cutting and patching requirements to be performed.
2. Ensure all components fit properly.
3. Remove out of sequence work installed prematurely.
4. Remove and correct defective work and work not conforming to requirements of Contract Documents.

B. Coordination:
1. Coordinate the installation of work with the work of other Contractors to minimize cutting and patching.

C. In addition to contract requirements, upon written instructions of the Architect/Engineer:
1. All new work must be inspected prior to enclosing. If inspection has not been conducted, Contractor shall uncover newly installed work to provide for Architect/Engineer's observation.

D. All Contractors shall bear the responsibility not to cut or otherwise alter the Owner’s property or any separate Contractors’ work except with the written consent of the Owner and of such separate Contractor. The Contractor shall not unreasonably withhold from the Owner or any separate Contractor, consent to cutting or otherwise altering the work.

E. Provide equipment, labor, materials, and incidentals necessary for cutting and patching as required for the installation of new work.

F. Prior to Cutting:

1. Provide shoring, bracing and support as required to maintain structural integrity of project. Contractor shall pay all cost of engineering associated with design of shoring system.
2. Provide protection for materials on adjacent surfaces.
3. Provide protection when work will be exposed to the elements.
4. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operation. Each Prime Contractor is responsible to cover and protect furniture, equipment, etc. not being used in rooms where furniture and equipment will remain during Contractors working hours.

G. Take all precautions necessary to avoid cutting existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

H. Cut back around removals to point where removal can be concealed with construction matching existing adjacent surfaces.

I. Trim edges of cuts neatly and properly where cuts are to be left exposed or where replacement work is to be installed.

J. Cap, plug, or otherwise seal disconnected items, openings, or devices.

K. Each prime contractor is responsible for all expenses related to “cutting and patching” procedures required to complete the work of their contract.

L. Do not cut and patch structural elements in a manner that would change their load bearing capacity or load - deflection ratio without first receiving approval from the Architect.
   1. Specific items include:
      a. Foundation construction.
      b. Bearing and retaining walls.
      c. Structural concrete.
      d. Structural steel.
      e. Lintels.
      f. Timber and primary wood framing.
      g. Structural decking.
      h. Stair systems.
      i. Miscellaneous structural metals.
      j. Exterior curtain-wall construction.
      k. Equipment supports.
      l. Piping, ductwork, vessels, and equipment.
      m. Structural systems of special construction.

M. Do not cut and patch operating elements or related components that would result in reducing their capacity to perform as intended or increase maintenance or decrease operational life or safety.
   1. Specific items include:
      a. Primary operational systems and equipment.
      b. Air or smoke barriers.
      c. Water, moisture, or vapor barriers.
      d. Membranes and flashings.
      e. Fire protection systems.
      f. Noise and vibration control elements and systems.
      g. Control systems.
      h. Communication systems.
      i. Conveying systems.
      j. Electrical wiring systems.

N. Do not cut and patch construction that would, in the Architects opinion reduce the buildings aesthetic qualities.

O. Unless otherwise specified, provide patching materials to match adjacent materials in type, construction, installation, and detailing.
   1. Plaster: do not use plaster patching compounds containing asbestos.
   2. Ceramic tile/structural glazed tile: match existing color and pattern of existing tile units.
   3. Resilient floor tile: match thickness, color, and composition of existing tile units.

P. Provide cutting and patching operations to ensure new work is flush with existing adjacent surfaces and terminations.

Q. When finished surfaces are cut so that smooth transition with new work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

R. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition; to Architect/Engineer for review.

S. Prepare substrates to receive new finish as required for proper application of new finish in accordance with new finish manufacturer's recommendations for existing conditions, including patching holes, leveling uneven surfaces, and similar work. Remove existing finishes where new wall, floor, or ceiling finishes are indicated.

T. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective work and work not conforming to requirements of Contract Documents.
   4. Provide equipment, labor, materials and incidentals necessary for cutting and patching as required for the installation of new work.
   5. Remove samples of installed Work for testing.
   6. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

U. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

1.8 EXECUTION

A. Plaster - patch existing plaster surfaces as follows:
   1. Missing plaster or plaster damaged to extent removal is required:
      a. Areas 20 sq. in. or less: apply plaster directly to substrate.
      b. Areas more than 20 sq. in.: use metal lath and plaster system over substrate.
   2. Cracked plaster not requiring removal: clean / remove any loose plaster, apply new plaster directly over crack with fiber mesh tape. Complete finish to extend a minimum 6 inches on both sides of crack and minimum 6 inches beyond both ends of crack. match existing texture.

B. Ceramic tile: match patterns and installation methods of existing tile.

C. Ceilings: review revised ceiling patterns with Architect in field prior to removal of existing ceiling.

D. Resilient flooring: clean mastic, dirt, and similar contaminants from substrate after removal of existing resilient flooring, and prepare substrate in accordance with recommendations of new flooring manufacturer.
   1. Where patching of existing resilient flooring constitutes more than 50 percent of existing floor surface in room, replace entire floor.

E. Hard surface floor: remove hard surfaces to required depth for installation of new finish materials, and prepare substrate as recommended by new finish material manufacturer, including acid etch or similar method.

F. Painting
   1. Where alteration work involves 1 or 2 walls in room or area, paint entire surface of only the walls involved in alteration.
   2. Where alteration work involves more than 2 walls in room or area, paint all walls in room or area, unless otherwise indicated.

1.9 QUALITY ASSURANCE

A. General: Structural and other conditions shall be verified with the Architect before proceeding with cutting, demolition and alterations work. Inspect structures prior to start of Work and notify the Architect in writing of any conditions detrimental to the execution of the Work.

B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

C. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

D. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

E. Costs caused by out of sequence work prematurely installed, defective work, or work not conforming to the Contract Documents, including costs for additional services of the Architect/Engineer, will be paid for by the party responsible for out of sequence, rejected or non-conforming work.

F. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
   1. Water, moisture, or vapor barriers.
   2. Membrane and flashings.
   3. Exterior curtain-wall construction.
   4. Equipment supports.
   5. Piping, ductwork, vessels, and equipment.
   6. Noise and vibration-control elements and systems.

G. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

H. Cut masonry and concrete materials using masonry saw or core drill.

I. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

J. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

K. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00 - Firestopping, to full thickness of penetrated element.

1.10 HAZARDOUS MATERIALS PROCEDURES

A. Hazardous materials: Each prime contractor is advised that if materials suspected to be lead, pcb, or to contain asbestos are encountered during construction, he shall immediately notify Owner and take precautions as required to avoid disturbing materials until directed by Owner.

PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 PERFORMANCE

A. Remove and store in protected location, material, which is to be reused and relocated.

B. Cutting shall be done in a manner that will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance.

C. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.

D. Restore work, which has been cut or removed. Provide new products to complete work in accordance with requirements of Contract Documents.

E. Refinish entire surfaces as necessary to provide an even finish:
1. Continuous Surfaces: to nearest intersections.
2. Assembly: entire refinishing.

F. Fill and patch openings and holes in existing construction when bolts, piping, ducts, conduit and other penetrating items are removed.

G. Visual requirements: Do no cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

H. Fire resistive integrity: Where holes or gaps remain from removed elements, fill void using solid fire resistive materials full depth of structure; terminate below finishes to allow new finish to be installed (see patching). Maintain the fire resistive and structural integrity of the structures.

I. Firestopping: All products used for through-penetration firestop systems shall be tested and meet all federal, state, and local codes.

J. Cutting: Cut existing construction use methods least likely to damage elements to be retained or adjoining construction. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing surfaces, cut or drill from the exposed or finished side into concealed surfaces.

3. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.

K. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Where removal of walls or partitions extends from one finished are to another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new.
4. Patching around piping and penetrations: Provide firestopping at perimeter of penetrations for smoke-tight seal to maintain integrity of fire resistive and smoke barrier qualities.
5. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.
   a. If two walls or more of a room are patched and painted, prepare and repaint the entire room - all wall surfaces.

L. Patch, repair, or rehang existing ceiling as necessary to provide an even plane surface of uniform appearance.

3.2 CLEANING

A. Daily cleaning of alteration areas of the building shall be the responsibility of each Contractor.

B. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely, paint, mortar, oils, putty, and items of similar nature. Thoroughly clean piping, conduit, and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

C. Dust generated by cutting and patching shall be controlled in a manner so as to prevent infiltration into occupied spaces. Contractor(s) responsible for dust infiltrating the existing duct systems shall bear the cost of cleaning these systems.

D. Demolished Materials shall be removed from the project site at frequent intervals. Piles of demolished materials will not be allowed to accumulate.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. References and standards.

B. Testing and inspection agencies and services.

C. Control of installation.

D. Mock-ups.

E. Tolerances.

F. Manufacturers' field services.

G. Defect Assessment.

H. Examination and Preparation

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

G. Definitions:
   1. General: Basic contract definitions are included in the Conditions of the Contract.
   2. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

3. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
4. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
5. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
6. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
7. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
8. Product: The term “product” refers to materials, systems and equipment.
9. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
10. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
    a. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.
    b. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trade persons of the corresponding generic name.
    c. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
        1) This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
11. “Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
12. "Replace": Used herein as a term contraction and unless specifically noted means "remove existing and provide new".
13. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

H. Specification Format and Content Explanation:
1. Specification Format: These Specifications are organized into Divisions and Sections based on the CSI-04 -Division format and Master Format numbering system.
2. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

a. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text and may include “prescriptive”, “open generic-descriptive”, “compliance with standards”, “performance”, “proprietary” or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
b. Abbreviated Language: Language used in Specifications and other Contract Documents are abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated, as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
c. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
    1) The words "shall be" are implied where a colon (:) is used within a sentence or phrase.
d. Overlapping and Conflicting Requirements: Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent is intended and will be enforced, unless specifically detailed language written into contract documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to the Architect for a decision before proceeding.
e. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended to be the minimum for the work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with the minimum (within specified tolerances), or may exceed that minimum (within reasonable limits). In complying with these requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of the requirements. Refer instances of uncertainty to the Architect for decisions before proceeding.
f. Specialists, Assignments: In certain instances, specification of text (requires or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the contractor has no choice or option. These requirements should not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; they are also not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party of entity involved in a specific unit of work is recognized as “expert” for the indicated construction process or operation. Nevertheless, the final responsibility for fulfillment of the entire set of requirements remains with the Contractor.

3. Conflict: If there be conflicting variance between the Drawings and the Specifications, the provisions of the Specifications shall control. In case of conflict on the drawings between larger and small scale details and plans, the larger scale plans and details shall control.

I. Industry Standards:
1. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
2. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

3. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   a. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

1.4 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ and pay for services of an independent testing agency to perform other specified testing and inspection.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

C. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.

D. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

E. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

F. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.

G. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

H. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 15 days in advance of required observations.
   1. Observer subject to approval of Architect.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.5 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

3.6 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

3.7 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substrate.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01 41 00
SPECIAL INSPECTIONS AND STRUCTURAL TESTING

PART 1 GENERAL

1.1 SUMMARY OF REFERENCE STANDARDS

A. Regulatory requirements applicable to special inspections are the following:
   1. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the 2020 Building Code of New York State.
      a. Also in accordance with NYS Education Department Guideline for Special Inspections.

1.2 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements.

1.3 GENERAL REQUIREMENTS

A. The program of Special Inspection and Structural Testing is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

B. This specification section is intended to inform the Contractor of the Owner's quality assurance program and the extent of the Contractor's responsibilities. This specification section is also intended to notify the Special Inspector, Testing Laboratory, and other Agents of the Special Inspector of their requirements and responsibilities.

C. The Special Inspector shall be the individual in charge of the Special Inspection program. The Special Inspector shall supervise and Review the work of the Testing and Inspection Agents for each testing or Inspection task. The Special Inspector shall be a licensed engineer in the state where the inspection and testing work is to be performed.

D. A Special Inspections and Structural Testing pre-construction meeting shall be held by the Special Inspector. The meeting shall include any Inspection and Testing Agents, the Contractor, any applicable subcontractors and the Structural Engineer. The purpose of the meeting shall be to identify the specifics of the Special Inspection program, including, but not limited to the following:
   1. Identify the Special Inspector and Testing Agents
   2. Review the specification section and Statement of Special Inspections
   3. Determine the distribution list for inspection reports
   4. Provide contact information
   5. Determine which party shall schedule inspections and testing

1.4 SCHEDULE OF INSPECTIONS AND TESTS

A. Required inspections and tests are described in the attached Schedule of Special Inspections and in the individual Specification Sections for the items to be inspected or tested.

1.5 QUALIFICATIONS

A. The Special Inspector shall be a licensed Professional Engineer or Structural Engineer who is approved by the Structural Engineer of Record (SER) and Code Enforcement Officer.

B. The Special Inspector shall verify the qualifications of each Inspection and Testing Agent comply with Section 1704.2.1 - Special inspector qualifications, and shall provide

documentation of each Agent to the Code Enforcement Official, Owner and Structural Engineer.

C. The Testing Laboratory shall maintain a full time licensed Professional Engineer or Structural Engineer on staff who shall certify all test reports. The Engineer shall be responsible for the training of the testing technicians and shall be in responsible charge of the field and laboratory testing operations.

D. Special Inspections shall be performed by inspectors who are either licensed Professional Engineers (P.E.), Structural Engineers (S.E.), or Engineers-In-Training (EIT) with an education and background in structural engineering except as indicated below.
   1. Special Inspections of soils and foundations may be performed by inspectors with an education and background in geotechnical engineering in lieu of a background in structural engineering.
   2. Technicians performing sampling and testing of concrete shall be ACI certified Concrete Field Testing Technicians - Grade 1.
   3. Inspectors performing inspections of concrete work such as inspections of concrete placement, batching, reinforcing placement, curing and protection, may be ACI certified Concrete Construction Inspectors or ICBO certified Reinforced Concrete Special Inspector in lieu of being a licensed P.E., S.E., or EIT.
   4. Inspectors performing inspections of prestressed concrete work may be ICBO/BOCA/SBCCI certified Prestressed Concrete Special Inspector.
   5. Inspectors performing inspections of masonry may be ICBO certified Structural Masonry Special Inspector.
   6. Technicians performing visual inspection of welding shall be AWS Certified Welding Inspectors or ICBO certified Structural Steel and Welding Special Inspectors, technicians performing non-destructive testing such as ultrasonic testing, radiographic testing, magnetic particle testing, or dye-penetrant testing shall be certified as an ASNT-TC Level II or Level III technician.
   7. Inspectors performing inspections of spray fireproofing may be ICBO certified Spray-Applied Fireproofing Special Inspector.
   8. Technicians performing standard tests described by specific ASTM Standards shall have training in the performance of such tests and must be able to demonstrate either by oral or written examination competence for the test to be conducted. They shall be under the supervision of a licensed Professional Engineer and shall not be permitted to independently evaluate test results.

1.6 SUBMITTALS

A. The Special Inspector and Inspection and Testing Agents shall submit to the SER and Code Enforcement Officer for review a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.

B. The Special Inspector and Inspection and Testing Agents shall disclose any past or present business relationship or potential conflict of interest with the Contractor or any of the Subcontractors whose work will be inspected or tested.

1.7 PAYMENT

A. The Owner shall engage and pay for the services of the Special Inspector, Agents of the Special Inspector, and Testing Laboratory.

B. If any materials which require Special Inspections are fabricated in a plant which is not located within 100 miles of the project, the Contractor shall be responsible for the travel expenses of the Special Inspector or Inspection and Testing Agents.

C. The Contractor shall be responsible for the cost of any retesting or re-inspection of work which fails to comply with the requirements of the Contract Documents.

1.8 CONTRACTOR RESPONSIBILITIES

A. The Contractor shall cooperate with the Inspector and their Inspection and Testing Agents so that the Special Inspections and testing may be performed without hindrance.

B. The Contractor shall review the Statement of Special Inspections and shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Special Inspector or Testing Laboratory at least 24 hours in advance of a required inspection or test. Un-inspected work that required inspection may be rejected solely on that basis.

C. The Contractor shall provide adequate OSHA-compliant access for the Special Inspector and their Inspection and Testing Agents for them to perform their work. This includes access to pipe scaffolds, swing-stage scaffolds, and any other methods of accessing the work areas that the Contractor or its agents to perform the work of the Contract.

D. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

E. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the Inspector and their Inspection and Testing Agents.

F. The Special Inspection program shall in no way relieve the Contractor of their obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program. All work that is to be subjected to Special Inspections shall first be reviewed by the Contractor’s quality control personnel.

G. The Contractor shall acknowledge each item listed as a discrepancy by the Special Inspection program in writing to the Owner, Architect, Engineer and Construction Manager. The acknowledgement shall identify whether or not the discrepancy has been corrected, is in compliance with the contract documents, and is ready for re-inspection.

H. The Contractor shall be solely responsible for construction site safety.

1.9 LIMITS ON AUTHORITY

A. The Special Inspector or Inspection and Testing Agents may not release, revoke, alter, or expand on the requirements of the Contract Documents.

B. The Special Inspector or Inspection and Testing Agents will not have control over the Contractor’s means and methods of construction.

C. The Special Inspector or Inspection and Testing Agents shall not be responsible for construction site safety.

D. The Special Inspector or Inspection and Testing Agents has no authority to stop the work.

1.10 STATEMENT OF SPECIAL INSPECTIONS

A. The Statement of Special Inspections will be prepared by the Structural Engineer of Record (SER). Refer to the attached forms.

B. The Statement of Special Inspections shall be submitted with the application for Building Permit.

1.11 RECORDS AND REPORTS

A. The Special Inspector and Inspection and Testing Agents shall notify the Contractor of their presence on the job site at the start of any required inspection or test.

B. Reports shall be submitted to the Special Inspector within three days of the inspection or test. Hand written reports may be submitted if final typed copies are not available.

C. The Special Inspector and Inspection and Testing Agents shall prepare detailed reports of each inspection or test and submit the reports to the Structural Engineer of Record within seven days of the inspection or test. . Reports shall include:
   1. Date of test or inspection
   2. Name of inspector or technician
   3. Location of specific areas tested or inspected
   4. Description of test or inspection and results
   5. Identification of discrepancies
   6. Indication that the Contractor was made aware of discrepancies
   7. Applicable ASTM standard
   8. Weather conditions
   9. Signature of the Special Inspector overseeing the testing

D. The Special Inspector shall submit interim reports to the Code Enforcement Officer at the end of each week which include all inspections and test reports received that week. Copies shall be sent to the SER, Architect, and Contractor.

E. Any discrepancies from the Contract Documents found during a Special Inspection shall be immediately reported to the Contractor. If the discrepancies are not corrected, the Special Inspector shall notify the SER and Code Enforcement Officer. Reports shall document all discrepancies identified and the corrective action taken.

F. The Inspection and Testing Agents shall immediately notify the Special Inspector and the SER by telephone or fax of any test results which fail to comply with the requirements of the Contract Documents.

G. At the completion of the work requiring Special Inspections, each Inspection and Testing Agents shall provide a statement to the Special Inspector that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed.

1.12 FINAL REPORT OF SPECIAL INSPECTIONS

A. The Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the SER and Code Enforcement Officer prior to the issuance of a Certificate of Use and Occupancy. Refer to the attached forms.

B. The Final Report of Special Inspections will certify that all required inspections have been performed and will itemize any discrepancies that were not corrected or resolved.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 ATTACHMENTS - SEE STATEMENT OF SPECIAL INSPECTION IMMEDIATELY FOLLOWING THIS SECTION

END OF SECTION

STATEMENT OF SPECIAL INSPECTIONS AND TESTS
As required by the 2020 Building Code of New York State (BCNYS)

NYS EDUCATION DEPARTMENT, Office of Facilities Planning
89 Washington Avenue, Room 1060 EBA, Albany, NY 12234

BCNYS § 1704.3 requires the project Design Professional to complete the Statement of Special Inspections and Tests.
BCNYS § 1704.2.3 requires the applicant to submit the completed statement of special inspections and tests with the contract documents per BCNYS § 106.1 for issuance of a building permit. The following statement of special inspections represents the minimum inspections expected for fulfillment of contractual obligations.

Project Title:
2021 Homer Capital Project

School District:	Building:
Homer Central School District	High School, Elementary, Junior High, Bus Garage, Press Box
SED Project Number:	Project Address:
11 070106 - several buildings	80 South West Street, Homer NY 13077

Architect/Engineer:
HUNT Engineers, Architects, Land Surveyors & Landscape Architect, D.P.C.

Name of Person Completing this Statement:	Phone:	Date:
Kristi l. Rathbun	(607) 358-1000	9/1/22

Comments:

	INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A.	**Structural Steel**						
1.	Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM Specifications. AISC 360 Section A3.3, N2	1705.2.1	✓	
2.	Inspection of high-strength bolting.	X	X	AISC 360, Section N5.6	1705.2.1	✓	
3.	Material verification of structural steel.		X	Applicable ASTM Specification. AISC 360 A3.1, N2	1705.2.1	✓	
4.	Material verification of welding consumables.		X	Applicable AWS Specification. AISC 360 Section A3.5, N2	1705.2.1	✓	
5.	Inspections of welding of structural steel.	X	X	AWS D1.1 AISC 360 N5.4 & 5.5	1705.2.1	✓	
6.	Inspection of steel frame joint details at each connection.		X	AISC 360 N5.8	1705.2.1	✓	
7.	Inspection of Galvanized Structural Steel Main Members		X	AISC 360 N5.7	1705.2.1		
B.	**Cold Formed Steel Deck**						
1.	Material Verification of Deck		X	SDI QA/QC SEC 6	1705.2.2	✓	
2.	Inspection of Field Welding of Deck		X	SDI QA/QC SEC 6, AWS D1.3	1705.2.2	✓	
3.	Inspection of Mechanical Fasteners.		X	SDI QA/QC SEC 6	1705.2.2	✓	
4.	Inspection of location and installation compliance		X	SDI QA/QC SEC 6	1705.2.2	✓	

	INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
C.	**Open Web Steel Joists & Joists Girders**						
1.	End Condition - Welding or Bolted.		X	SJI 100, SJI 200	1705.2.3		
2.	Bridging - Horizontal or Diagonal.		X	SJI 100, SJI 200	1705.2.3		
D.	**Concrete Construction**						
1.	Inspection of reinforcing steel, including prestressing tendons, and verify placement.		X	ACI 318:CH20, 25.2, 25.3, 26.6.1-26.6.3	1705.3 1908.4	✓	
2.	Inspection of reinforcing steel welding.	X	X	AWS D1.4; ACI 318: 26.6.4	1705.3 1705.3.1		
3.	Inspection of anchors cast in concrete.		X	ACI 318 17.8.2; AISC 360 N5.7	1705.3 1705.2.1	✓	
4.	Inspection of post installed mechanical and adhesive anchors.	X	X	ACI 318 17.8.2.4 ACI 318 17.8.2	1705.3	✓	
5.	Verify use of required design mix.		X	ACI 318: CH19, 26.4.3, 26.4.4	1705.3 1904.1 1904.2 1908.2 1908.3	✓	
6.	Sampling fresh concrete; slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 26.5, 26.12	1705.3 1908.10	✓	
7.	Inspection of concrete placement and shotcrete placement for proper application techniques.	X		ACI 318: 26.5	1705.3 1908.6 1908.7 1908.8	✓	
8.	Inspection for maintenance of specific curing temperature and techniques.		X	ACI 318: 26.5.3-26.5.5	1705.3 1908.9	✓	
9.	Inspection of prestressed concrete.	X		ACI 318: 26.10	1705.3		
10.	Inspection of the erection of precast concrete members.		X	ACI 318: 26.9	1705.3		
11.	Verification of in-situ concrete strength prior to removal of shores and forms from beams and slabs, and prior to stressing of tendons.		X	ACI 318: 26.11.2	1705.3		
12.	Inspection of formwork for concrete member being formed.		X	ACI 318: 26.11.1.2 (b)	1705.3	✓	

Inspection Task			Frequency: CONTINUOUS	Frequency: PERIODIC	BCNYS REFERENCE	CHECK IF REQUIRED	Reference Standard for Criteria: TMS 402	Reference Standard for Criteria: TMS 602
E.	**Masonry Construction**							
	B=	**Level B inspection required for building Risk Categories I, II, & III**			1705.4	✓	TMS 402	TMS 602
	C=	**Level C inspection required for building Risk Category IV**			1705.4		TMS 402	TMS 602
1.		Verify compliance with the approved submittals.		B & C	1705.4	✓		Art. 1.5
2.		Verify that the following are in compliance.						
	a.	Proportions of site-mixed mortar, grout, and prestressing grout for bonded tendons.		B & C	1705.4	✓		Art 2.1, 2.6 A, 2.6 B, 2.6 C, 2.4 G.1.b
	b.	Grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.		B & C	1705.4	✓	Sec. 6.1	Art. 2.4, 3.4
	c.	Placement of masonry units and construction of mortar joints.		B & C	1705.4	✓		Art. 3.3 B
	d.	Location and placement of reinforcement, connectors, and prestressing tendons and anchorages.	C	B	1705.4	✓	Sec. 6.1, 6.2.1, 6.2.6, 6.2.7	Art. 3.2 E, 3.4, 3.6 A
	e.	Grout space prior to grouting.	C	B	1705.4	✓		Art. 3.2 D, 3.2 F
	f.	Placement of grout and prestressing grout for bonded tendons.	B & C		1705.4	✓		Art. 3.5, 3.6 C
	g.	Size and location of structural elements.		B & C	1705.4	✓		Art. 3.3 F
	h.	Type, size, and location of anchors including other details of anchorage of masonry to structural members, frames, or other construction.	C	B	1705.4	✓	Sec. 1.2.1(e), 6.1.4.3, 6.2.1	
	i.	Welding of reinforcement.	B & C		1705.4		Sec. 8.1.6.7.2, 9.3.3.4(c), 11.3.3.4(b)	

Inspection Task			Frequency		BCNYS REFERENCE	CHECK IF REQUIRED	Reference Standard for Criteria	
			CONTINUOUS	PERIODIC			TMS 402/ACI 530/ASCE 5	TMS 602/ACI 530.1/ASCE 6
	j.	Preparation, construction, and protection of masonry during cold weather (below 40°F(4.4°C)) or hot weather (above 90°F (32.2°C)).		B & C	1705.4	✓		Art. 1.8 C, 1.8 D
	k.	Prestressing technique Application and measurement or prestressing force.	B & C	B	1705.4			Art. 3.6 B
	l.	Placement of AAC masonry units and construction of thin mortar joints.	B & C	B	1705.4			Art. 3.3 B9, 3.3 F.1.b
	m.	Properties of thin-bed mortar for AAC masonry.	B & C	B	1705.4			Art. 2.1 C.1
3.		Observe preparation of grout specimens, mortar specimens, and/or prisms.	C	B	1705.4	✓		Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4

	INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	CONTINUOUS	PERIODIC	REFERENCE STANDARD	BCNYS REFERENCE	CHECK IF REQUIRED	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
F.	**Wood Construction**						
1.	Fabrication process of prefabricated wood structural elements and assemblies.	X			1705.5 1704.2.5		
2.	High-load diaphragms designed in accordance with Section 2306.2.	X			1705.5.1 1704.2		
3.	Metal plate connected wood trusses spanning 60' or more	X			1705.5.2		
G.	**Soils**	X	X		1705.6	✓	
H.	**Driven Deep Foundations**	X			1705.7		
I.	**Cast-in-Place Deep Foundations**	X			1705.8		
J.	**Helical Pile Foundations**	X			1705.9		
K.	**Fabricated Items**	X			1705.10 1704.2.5	✓	
L.	**Sprayed Fire-Resistant Materials**				1705.14 1705.14.2 1705.14.3 1705.14.4 1705.14.5 1705.14.6		
M.	**Mastic and Instumescent Fire-Resistant Coatings**			AWCI 12-B	1705.15		
N.	**Exterior Insulation and Finish Systems (EIFS)**				1705.16		
O.	**Fire-Resistant Penetrations & Joints.** **Risk category III & IV**				1705.17		
P.	**Smoke Control**				1705.18		
Q.	**Special Inspections for Wind Resistance**				1705.11 1704.2		
R.	**Special Inspections for Seismic Resistance**				1705.12 1704.2		
S.	**Structural Testing for Seismic Resistance**				1705.13 1704.2		
T.	**In-Situ Load Tests**				1708		
X.	**Preconstruction Load Tests**				1709		
Y.	**Other** **-See spec 01 41 00**						

Final Report of Special Inspections

Project: ***2021 Homer Capital Project***

Location: ***80 South West Street, Homer NY 13077***

Owner: ***Homer Central School District***
Thomas Turck, Superintendant of Schools

Owner's Address: ***p.o. Box 500, 80 South West Road***
Homer, NY 13077

Architect of Record: ***HUNT Engineers, Architects, Land Surveyors & Landscape Architect, D.P.C.***
Jeff Robbins, AIA

Structural Engineer of Record: ***HUNT Engineers, Architects, Land Surveyors & Landscape Architect, D.P.C.***
Kristi l. Rathbun, PE

To the best of my information, knowledge and belief, the Special Inspections required for this project, and itemized in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections.)

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Special Inspector

(Type or print name)

Signature Date

Licensed Professional Seal

Final Report of Special Inspections

Agent's Final Report

Project: ***2021 Homer Capital Project***

Agent:

Special Inspector:

To the best of my information, knowledge and belief, the Special Inspections or testing required for this project, and designated for this Agent in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved other than the following:

Comments:

(Attach continuation sheets if required to complete the description of corrections.)

Respectfully submitted,
Agent of the Special Inspector

(Type or print name)

Signature Date

Licensed Professional Seal or Certification

SECTION 01 41 13
CODES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Building Code Standards

1.2 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements: References and Standards.

1.3 SUMMARY OF BUILDING CODE STANDARDS

A. The design of this project conforms to all applicable provisions of, and Work shall be performed in accordance with the following:
   1. The New York State Uniform Fire Prevention and Building Code (the "Uniform Code"), comprised of the following Titles; including, but not limited to:
      a. 2020 Building Code Of New York State (BCNYS).
      b. 2020 Existing Building Code of New York State (EBCNYS).
      c. 2020 Fire Code of New York State (FCNYS).
      d. 2020 Fuel Gas Code of New York State (FGCNYS).
      e. 2020 Mechanical Code of New York State (MCNYS).
      f. 2020 Plumbing Code of New York State (PCNYS).
      g. NFPA 70 - National Electric Code: Latest edition adopted by Authority Having Jurisdiction.
   2. The 2020 Energy Conservation Construction Code of New York State (ECCCNYS).
   3. The New York State Education Department (NYSED) Manual of Planning Standards:
      a. Most recent edition adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. Where any reference is made within the contract documents to "applicable code" regarding the Design, Product, or Work of this project, applicable code shall be the appropriate code, herein referenced, current at time of contract document issuance.

C. Should any reference be made to previously adopted codes, standards, or regulations contrary to the foregoing, the most current version adopted, at time of document issuance, shall govern.

D. In the event of conflicting provisions between two referenced codes, standards, or regulations, the more stringent shall prevail.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 30
TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section defines the responsibilities of testing and laboratory services.

1.3 DESCRIPTION

A. Each Contractor shall perform all testing and prepare all test reports and/or certifications required by the Contract Documents, and shall fully cooperate with any testing and/or inspection agencies retained by the Contractor, Owner, Construction Manager, or the Architect and their consultants, including implementation of any remedial work recommended as a result of such inspections.

1.4 QUALITY ASSURANCE

A. Laboratory services are solely an assurance that contract provisions are being met.
B. Forward copies of results of tests by Contractor to the Architect, Construction Manager, and relevant parties within 24 hours.
C. Required testing and test procedures are indicated under each Division of the Technical Specifications and all federal, state, and local requirements.
D. The Contractor shall provide all testing services not specified to be the owner's responsibility.
E. The Architect shall reserve the right to require additional information as is deemed necessary to fully evaluate testing results.

1.5 SCOPE OF WORK

A. Owner Responsibility: Where testing requirements are indicated in the Technical Specification section as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged. The description of the types of testing and inspecting they are engaged to perform is as outlined in the technical specifications.
2. Testing laboratory services provided by the Owner:
    a. Field density tests of soils in place for all fills and backfills, including structural fills.
    b. Sieve analysis of proposed backfill material.
    c. Tests for suitability of footing subgrade.
    d. Compressive and bearing tests of undisturbed soils.
    e. Compressive strength tests for concrete placed on site.
        i. One set of 3 cylinders for each 50 cubic yards, or fraction thereof, placed in one day. One specimen tested at 7 days and 2 specimens tested at 28 days.
    f. Compressive strength tests for mortar placed on site.
    g. Tests for tightness of bolts and quality of welds for structural steel.
    h. Field and/or shop inspection of structural steel, deck, and miscellaneous metals.
    i. Field inspection of fireproofing required thickness and/or pull test.
    j. Thickness of field applied paint/stain.
    k. Asbestos Abatement project and air monitoring.
    l. Testing related to remedial operations or possible deficiencies.

SECTION 01 45 30
TESTING LABORATORY SERVICES

B. Contractor Responsibility: Unless otherwise indicated, provide all testing services specified.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality control services. A qualified testing agency is an agency with experience and capability to conduct testing and inspection indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
2. Tests shall be scheduled by the appropriate Contractor requiring the testing and provide notification to the Construction Manager to meet with the construction schedule milestones.
3. Submit a copy of certified written testing report to the Construction Manager, Architect, and relevant parties.
4. Testing and inspecting requested / required by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Costs for re-testing and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
6. The Contractor shall complete all test report forms, including signature of the Construction Manager representative witnessing the test performed. Provide a copy of the completed test report to the Construction Manager for record.

1.6 LIMITS OF AUTHORITY

A. The Special Inspectors or Testing Laboratories will not have control over the Contractor's means and methods of construction.
B. The Special Inspectors or Testing Laboratories have no authority to stop the work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 RESPONSIBILITIES AND DUTIES OF CONTRACTOR

A. To facilitate testing services, the Contractor shall:

1. Furnish to the Laboratory such samples of materials as may be necessary for testing purposes.
2. Furnish such casual labor, equipment and facilities as is necessary to obtain and handle samples at the project.
3. Schedule the Testing Agency sufficiently in advance of operations to allow for completion of tests and for the assignment of personnel.
4. Provide and maintain, for the sole use of the Testing Agency, adequate facilities for safe storage and proper curing of concrete test cylinders on the project site for the first 24 hours as required by ASTM C31-69.
5. Maintain records at the project site showing the date and extent of each concrete placement.
6. Provide safe access to items to be tested. This includes sheeting and ladders for deep excavation; scaffolding and ladders for inspection and testing of superstructure items.
7. Full cooperation with all firms performing testing and inspection work is expected from all Contractor personnel.

B. If any portion of the work shows low test results, evidence of detrimental placing or curing conditions, the Owner may require additional testing, compaction, cored samples or re-welding at the Contractor's expense. In no case shall the inspector prescribe the method of repair of the defect. Repair recommendations will be provided by the Architect/Engineer.

END OF SECTION

SECTION 01 51 00
TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Supplemental General Conditions and other Division 1 Specification Sections, apply to this section.
B. Section 01 10 00 – Summary of Work

1.2 SUMMARY

A. This Section includes detailed requirements for temporary facilities and controls, including temporary utilities, support facilities, security and protection.

1.3 QUALITY ASSURANCE

A. Regulation: Each Prime Contractor / Subcontractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements
2. Health and safety regulations
3. Utility company regulations
4. Police, fire department and rescue squad rules
5. Environmental protection regulations
6. Health Department regulations
7. New York State Education Department requirements

B. Standards: Each Prime Contractor shall comply with NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations”, ANSI-A10 series standards for “Safety Requirements for Construction and Demolition”, and NECA Electrical Design Library “Temporary Electrical Facilities”.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions.
2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

A. Temporary Utilities: Each Prime Contractor shall prepare a schedule indicating dates for implementation and termination of each temporary utility for which the Prime Contractor is responsible. At the earliest feasible time or unless otherwise noted, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

1.5 DESCRIPTION

A. Description: Each contractor shall provide its own temporary facilities unless noted otherwise. Including storage and office trailers, power, telephone, and all costs associated thereof.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Each Prime Contractor shall provide new materials. If acceptable to the Architect, undamaged, previously used materials in serviceable condition may be used. Provide materials suitable for use intended.

B. Temporary Containment Partitions

1. Nominal 3-5/8" – 25 gage metal stud.
2. Batt insulation.
3. Type X 5/8" fire rated gypsum wallboard with taped joints on both sides.
4. ½" fire rated plywood liner on the demolition side.
5. In lieu of 5/8" GWBX and ½" FRT plywood, Contractor may substitute one layer of 5/8" U.S. Gypsum Fiberock abuse-resistant type X gypsum wallboard on demolition side.
6. Containment partitions are to have a 6-mil flame retardant polyethylene liner.
7. Paint occupied side of partition: 1 coat primer, 1 coat paint.

C. Lumber and Plywood: Comply with requirements as outlined in the Specifications.

1. For fences and vision barriers, provide minimum 3/8 inch (9.5 mm) thick exterior plywood.
2. For safety barriers, temporary exit ramps, temporary entrances, and similar uses, provide minimum 5/8 inch (16 mm) thick exterior plywood.

D. Paint: Comply with requirements as outlined in the Specifications.

1. For job-built sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior prime.
2. For sign panels and applied graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
3. For interior walls of temporary offices, provide two (2) coats interior latex-flat wall paint.

E. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

F. Water: Provide potable water approved by local health authorities.

2.2 EQUIPMENT

A. Water Hoses: Provide 3/4 inch (19 mm) heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles a hose discharge.

B. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

C. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

D. Lamps and Light Fixtures: Provide general service 26-watt compact fluorescent lamps required for adequate illumination. Provide guard cages or tempered-glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

E. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized Trade association related to the type of fuel being consumed.

F. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

2. U.L. Labeled with current inspection tags affixed.

PART 3 - FACILITIES

3.1 TEMPORARY SANITARY FACILITIES / BREAK FACILITIES

A. The General Construction Contractor will provide portable toilets as noted below:

1. Furnish chemical toilets per OSHA 1926.51.C with hand washing facilities at the site for ALL Contractors, Subcontractors, etc. working at the site for the duration of the project. Maintain in a sanitary and clean condition at all times.
2. Toilets shall be maintained, located and removed as directed by Construction Manager. Contents shall be removed and disposed of in a manner and at such intervals as necessary to maintain sanitary conditions; at minimum, weekly.
3. Construction Manager's daily report will be used to determine number of toilets should there be a disagreement among the Trades.
4. Contractor's personnel will not be permitted to use the Owner's facilities.

B. Each Prime Contractor shall provide appropriate break facilities for the workers in their employ. Facilities shall be provided where PPE does not need to be worn. These break facilities shall include appropriate changing facilities. These areas shall be heated or cooled as necessary, include an appropriate number of lockers, tables and chairs and be separated from wok or storage areas. The cleaning of these facilities shall be the responsibility of the contractor.

3.2 TEMPORARY WATER

A. Drinking Water: Each Contractor will provide potable water for drinking purposes for its own personnel on the site. This will be accomplished through the use of portable water containers. Furnish disposable drinking cups and receptacles to collect used drinking cups within the general location of the portable water container.

B. Construction Water: Until such time, the Plumbing Contractor makes temporary construction water available, each Contractor needs to bring in water from an offsite source to support their construction operations at no additional cost to the Owner. This would include all concrete and masonry operations, all paving operations, the testing of sanitary and storm water piping systems, and the irrigation of grass areas. In no way shall the limitations stated above be construed to negate the Contractors responsibility to provide the water required for various construction operations. It is the intent to use water from the Owner's domestic water system to test and fill any potable water system or to test and fill any mechanical hot water heating system, if the water is available from the Owner's domestic water system.

C. The Plumbing Contractor shall provide and maintain temporary water service for the construction sites. A minimum of two (2) frost free hose bibs are required. At these locations the Plumbing Contractor shall provide a "Back Flow Prevention Device" to prevent contaminated water from backing up into the Owner's domestic water system. Locations of these outlets to be approved by the Construction Manager. Each Contractor is responsible for providing hoses for their own use. The Plumbing Contractor shall remove the temporary connections when and as directed by the Construction Manager.

3.3 SNOW AND ICE REMOVAL

A. The General Construction Contractor shall provide snow and ice removal of project road and work areas, parking areas, and maintain safe access to the construction site including all emergency egress pathways. Any snow accumulation of 3" or more shall be removed. Any ice conditions shall be sanded or removed to maintain safe passage into the construction areas.

B. The Plumbing Contractor shall provide all snow and ice removal off roof areas for installation plumbing work on roof areas.

3.4 SITE LOGISTICS

A. The General Construction Contractor shall provide and maintain the following in accordance with the Site Logistics and Phasing plan:
   1. Temporary Construction Fencing
   2. Temporary Concrete Barrier with Fence.
   3. Construction lay down area and parking area
   4. Temporary access roadways and construction entrances
   5. Protection of existing trees, bushes, and site amenities

B. Each Contractor must plan, provide and maintain his own access, ramping, and egress as required into and out of the site, staging of trailer(s), materials, machinery, and equipment in agreement with the Construction Manager. Contractor shall maintain free and safe access on the jobsite for other related project personnel.

C. The General Construction Contractor shall maintain all temporary construction parking areas, temporary access roads and fences for the duration of the project. At the end of construction, the General Construction Contractor shall remove temporary fencing, temporary access roads, and stone and be responsible to repave, re-grade and seed existing areas disturbed as required to return the area to its original or specified condition.

3.5 DUMPSTERS AND RUBBISH CONTAINERS

A. All dumpsters are to be tarped or covered and protected from wind and weather.

B. The General Construction Contractor shall provide multiple dumpsters for all trades except for the Roofing Contractor (RC), for the duration of the project. The Roofing Contractor (RC) shall provide dumpsters for all roofing work.

   a. All Prime Contractors are to participate in placing recyclable items in the correct dumpsters as directed by the dumpsters suppliers' guide lines and any local or state laws which govern recycling. The General Construction Contractor shall clearly indicate to other trades what materials are to be placed in which dumpster to conform with recycling requirements. The other trades that are to use the dumpsters provided by the General Construction Contractor shall comply with the directions of the General Construction Contractor as to "crush" and condense debris placed in these dumpsters. This includes, but is not limited to, ductwork removed by the HVAC Contractor and empty boxes of any trades. Nothing in this specification shall relieve each Contractor from cleaning up their own debris and delivering debris to the proper dumpster.

   b. The placement of any dumpster on the project sites shall be coordinated with the Construction Manager as to their location. The General Construction Contractor shall be responsible for the emptying and removal of the dumpsters they are providing, including all tipping fees.

C. The Roofing (RC) Contractor shall provide multiple dumpsters for all roofing work for the duration of the project.
   a. The Roofing (RC) Contractor shall provide all required dumpsters relative to their scope of work for excess roofing materials. Include emptying, removal and all tipping fees.

D. The General Construction Contractor shall provide enclosed trash chutes for removal of debris on multiple floor structures for all Prime Contractors.

E. The General Construction Contractor's Asbestos Abatement subcontractor shall provide required dumpsters relative to their scope of work.

F. The General Construction Contractor shall provide site and interior trash receptacles for daily clean up and collection of trash and debris. Provide separate receptacles for rubbish and recyclables. All trades are responsible for emptying these containers, daily into dumpsters with the labor supplied for daily clean up requirements.

3.6 DEWATERING

A. The General Construction Contractor shall provide a minimum of four (4) temporary dewatering sump pits for the removal of water from the project site to facilitate the removal and discharge of sediment-laden water from an excavated area, construction site or sediment basin.

B. Dewatering sump pits shall properly remove suspended sediments and water from excavated areas through filtration and/or settlement prior to discharging water to a receiving water course or body. Dewatering operations performed by the General Construction Contractor shall comply with New York State Department of Conservation requirements.

C. Dewatering sump pits shall consist of the following:
   1. Removable Pumping Stations
   2. Suction hoses
   3. 12" – 36" Perforated Corrugated Metal or PVC standpipe wrapped in geotextile filtration fabric. Depth of standpipe will vary due to water level and will need to extend 12" to 18" above the top of the pit. Standpipe shall be fitted with a watertight cap or plate at the bottom of the standpipe.
   4. 12" base of clean stone beneath standpipe. Fill standpipe with NYS DOT Item 304-2.02, Type for per Specification Section 32 23 23.
   5. Pit dimensions are variable, with the minimum diameter being 2 times the standpipe diameter.
   6. Sediment Tank / Silt Control Bags.
   7. Maintenance of the system.

3.7 TEMPORARY BUILDING ENCLOSURES

D. The General Construction Contractor shall provide insulated temporary weather / air tight / dust / acoustic enclosures at all openings through the building envelope and shall maintain these enclosures until the opening is used for its intended function. In all cases where temporary enclosures are required the following shall apply:

   1. The Contractor who is responsible to provide the temporary enclosure as stated above, shall submit to the Architect and the Construction Manager an outline how this temporary enclosure is going to evolve. This submission should be detailed, including the materials that are going to be used in the temporary enclosure. These materials shall be of the type that does not promote the spread of flames and smoke in the case of a fire. Only materials approved by the Architect shall be used. All temporary enclosures are required to be insulated to conserve energy to temporarily heat the temporary enclosure.
   2. The Contractor responsible for the temporary enclosure shall provide temporary doors in the exterior building enclosure as required. Install approved material to act as framing at all four sides of each door. Provide hardware for the doors as required. Provide automatic door closers on all such doors. Door hardware shall include the hinges and a panic type latching device which will allow emergency exiting from the structure, but would limit entry to the structure from the outside without a key to gain entry. Provide keys to the Construction Manager, to the Owner and to other Contractors as directed by the Construction Manager. Single doors shall be a minimum of 36" wide and double doors are to be a minimum of 44" wide. Coordinate with the Construction Manager on the size of the door required. Weather strip all openings and provide door sweeps on all doors.

E. The General Construction Contractor shall not provide any direct connection from the Owner occupied interior space to the renovation areas until authorized by the Construction Manager to do so. This will ensure that the atmosphere in the construction area does not contaminate the atmosphere in the Owner occupied areas during construction.

F. The General Construction Contractor shall by August 1st, prior to each heating season, provide a temporary enclosure plan in writing, along with any sketches that will accurately describe their proposal of how they are going to enclose renovation areas in order to maintain weather tightness and minimize heat loss. This plan shall be submitted to the Construction Manager who will review it with the Owner, Architect, and Engineer. Approval of this plan does not relieve the General Construction Contractor from providing and maintaining the temporary enclosures as indicated in this section.

G. The General Construction Contractor shall provide protection of all existing window and door areas exposed to new construction during the window replacement process.

H. Each Contractor is responsible to provide a fully secured insulated weathertight temporary plywood protection for all openings created by the respective Contractor creating the penetration for installation of their work.

3.7 TEMPORARY CONTAINMENT PARTITIONS

A. The General Construction Contractor shall provide all temporary containment partitions.

B. Seal all joints, door penetrations and the perimeter of the temporary containment partition.

C. Polyethylene liner shall cover the entire surface of the partition and is to be sealed to the existing structure to prevent any infiltration of dust or odors into the Owner occupied areas.

D. Provide temporary doors and emergency exit windows in the containment partitions as required. Install approved materials to act as framing at all four sides of each door and window. Provide hardware for the doors and windows as required. Provide automatic closures, weather stripping, and sweeps on all such doors. Where partitions enclose exit passages, provide rated partition construction with panic devices at self-closing rated doors.

3.8 TEMPORARY FIRE PROTECTION

A. The General Construction Contractor shall provide and maintain portable fire extinguishers on each floor level and building area in accordance with OSHA requirements (1926-150).

B. Each contractor performing “Hot Work” is required to provide their own fire extinguishers.

C. Each contractor shall provide fire extinguishers at their jobsite trailer / equipment, toolbox locations, and stairways.

3.9 TEMPORARY FENCING, BARRICADING

A. Each Contractor shall provide and maintain temporary fencing, covers and barricading as required to keep unauthorized persons away from excavations and hazardous areas for which contractor is responsible. The Contractor(s) shall provide protection, which is acceptable to Construction Manager, and/or as specified in the Specifications and which meet or exceed current OSHA Requirements. Relocate all items at the direction of the Construction Manager.

B. Any contractor that creates or contributes to an unsafe condition, such as, but not limited to, a fall hazard shall correct the hazard immediately.

C. Each Contractor who requires temporary or permanent removal of perimeter and opening protection to perform their own work, shall remove and replace such protection promptly prior to leaving the area. Protection permanently removed shall be returned to the Contractor who provided the protection. Contractor shall not allow openings or edges to be unguarded or unprotected at any time, i.e. slab openings, trenches, elevator shafts, duct chases, stairwells, slab edges, etc.

D. The General Construction Contractor shall provide and maintain a galvanized chain link fence, eight (8) foot high with lockable gates (vehicle and man) to serve as the temporary construction fence and Contractor lay down areas, per Contract Drawings, Logistics and the Phasing Plans. The General Construction Contractor shall remove or relocate the fence as directed by the Construction Manager.

E. The General Construction Contractor shall provide and maintain concrete barriers with mounted galvanized chain link fence, eight (8) foot high above the ground with lockable gates (vehicle and man) to serve as the temporary construction fencing at Homer Intermediate / Junior High School, Homer High School and Homer Elementary School as indicated per Site Logistics and the Phasing Plans. The General Construction Contractor shall remove or relocate the fence as directed by the Construction Manager.

F. All other fencing shall be plastic orange construction fence.

G. When required for safety, each Contractor shall provide and maintain fences at its own expense, along the roadways and around the grounds for the protection of adjoining property and all persons lawfully using same.

3.10 CONSTRUCTION SIGNS

A. Each Contractor is required to provide all required construction site signage for traffic, safety and directions as it pertains to their scope of work. Provide all required temporary traffic controls as required to facilitate the project. This includes warning signs, traffic signs, barrier, warning lights, etc.

B. The General Construction Contractor is required to provide all dual language safety signage with pictorial and verbal identification. Signage should include but is not limited to Caution, Danger and Warning signs for entry, hardhat requirements, interior emergency egress signage, visitors must report to the Construction Manager's office prior to entrance, etc. This signage excludes the main project sign.

C. Contractor shall provide, move, remove, and maintain all signs where indicated on the plans or as requested by the Construction Manager.

3.11 MAINTENANCE AND PROTECTION OF VEHICULAR AND PEDESTRIAN TRAFFIC

A. Each Contractor shall provide and maintain adequate traffic controls in areas impacting routine vehicular and pedestrian traffic patterns, including temporary lane closures, for the duration of the project. Each Contractor is responsible to ensure the safe and convenient passage of Owner's staff, motorists, pedestrians, adjacent property Owners', and Contractor's employees.

1. Construction traffic shall not be permitted on Owner driveways or staff/patron parking areas unless authorized by the Construction Manager and Owner.
2. Traffic shall be maintained over a reasonably smooth traveled surface which shall be so marked by signs, delineators, guide devices, barriers, pavement markings and other methods that a person who has no knowledge of conditions may safely and with a minimum of discomfort and inconvenience ride, drive, or walk, day or night, over all or any portion of the work under construction where traffic is to be maintained. Installation, moving, and removing of any such delineators or guiding devices shall be included.
    a. All reflective delineators, markers, or barriers shall be provided as specified in the New York State Manual of Uniform Traffic Control Devices.

3. Schedule and coordinate work to minimize the impact that removal of existing concrete, pavements and / or facilities shall have on Owner and public.

B. Each Contractor shall repair any damage to concrete and pavements caused by construction operations and the installation of temporary signs, railings, etc. necessary for the maintenance and protection of traffic.

C. Each Contractor shall employ a sufficient number of competent flagmen and/or temporary traffic lights to ensure safe passage of vehicular, equipment, and pedestrian traffic. Flagmen shall wear approved safety equipment and vests in conformance with the New York State Manual of Uniform Traffic Control Devices.

D. The General Construction Contractor shall provide temporary markings approved by the Construction Manager and Architect if permanent markings may not be installed. In order not to inhibit bonding of permanent pavement markings, said locations shall be offset an appropriate distance from the location of permanent pavement markings.

E. Existing signs, markers, and delineators lost or damaged because of negligence on the part of the Contractor shall be replaced at the Contractor's expense.

F. The General Construction Contractor shall provide all street sweeping and / or clean up as required of roads, parking lots, and entrances to remove construction related dirt and debris on a daily basis, or as directed by the Construction Manager.

G. Any vehicle leaving the jobsite that provides materials or manpower, shall be water washed or shall utilize a "vehicle tracking Pad" prior to entry on access roads or public streets to remove mud and concrete from wheels and undercarriages. The General Construction Contractor to provide garden hose and nozzle at location coordinated with Construction Manager. Washing waste must not be directed to storm drains. All surface water outside the jobsite affected by contractors' activities must be filtered using sediment control fabric to prevent the streets from being muddy. A "vehicle tracking Pad" is an option to the water wash station. Contractor providing vehicle tracking pad shall provide, complete, all maintenance and removal of vehicle tracking pad.

3.12 DUST AND EROSION PROTECTION

A. All Contractors are required to erect and maintain dust and erosion protection whenever operations will produce unreasonable amounts of dust, dirt, or erosion.

B. Dusty conditions resulting from Contractor's operations shall be corrected by the use of water, or other methods approved by the Construction Manager and Architect. Water used as a dust palliative shall be distributed uniformly over a minimum width of eight feet by the use of suitable spray heads or spray bar.

C. Contractor shall devote particular attention to all new and existing drainage facilities, keeping them fully operative at all times. Ditches shall be provided at all times, even during grading operations, to adequately drain the traveled way and the remainder of the right-of-way areas.

3.13 TEMPORARY STORAGE

A. Storage space is limited and will be permitted only in areas designated by the Construction Manager in advance.

B. Each Contractor is responsible for protection of their own stored materials, both interior and exterior. This includes removal and / or protection from snow, ice, rain, dirt, or other damage. All construction materials shall be stored in a safe and secure manner. Contractor shall assume full responsibility for the protection and safekeeping of products under this Contract stored on the site and shall cooperate with the Construction Manager to ensure security for the Owner's property. Fences around construction supplies or debris shall be maintained. Gates shall always be locked unless worker is in attendance to prevent unauthorized entry.

C. Each Contractor shall obtain and pay for the use of additional storage or work areas needed for their operations.

3.14 TEMPORARY CLIMATE CONTROL

A. Within 45 days of Contract award, the HVAC Contractor shall submit to the Construction Manager for approval a plan describing proposed system including distribution for construction areas and/or occupied areas. Plan shall include sketches and proposed equipment for the following:
   1. Temporary heating
   2. Temporary ventilation and exhaust
   3. Temporary humidity control

B. All equipment (existing, temporary, or new) shall be protected from construction dust by the means of a filtration media with a Minimum Efficiency Reporting Value (MERV) of eight (8). These filters shall be changed at a minimum of once a month, or as directed by the Construction Manager. Provide one (1) set of clean filters just prior to final occupancy.

C. All Contractors are responsible to provide any additional temporary construction heat required for construction operations related to their scope of work. This would include but not limited to additional temporary heat to supplement the temporary heat described below. The General Construction Contractor shall provide temporary heat and enclosures for all concrete work, masonry work, all exterior wall construction systems and finishes.

D. New Construction
   1. Temporary Heat:
      a. The HVAC Contractor shall provide temporary heat between September 15th and May 15th of each year.
         i. Provide gas / propane fired heaters, inline blowers as required, including hoses and/or temporary piping, hook-ups, maintenance, service, removal and cost of fuel. Units are to be sized to maintain the temperature within the temporary enclosure between 55 and 60 degrees Fahrenheit.
         ii. Create and maintain a temporary heat and humidity log in a format acceptable to the Construction Manager. Temperatures and humidity levels shall be taken at a minimum of twice daily; in the early morning and late afternoon. These reports shall be submitted to the Construction Manager with the Contractor's daily work reports.
   2. Temporary Ventilation and Exhaust:
      a. The HVAC Contractor shall provide portable high performance fans for work areas.
      b. Size temporary air systems to supply a minimum of one complete air change every 120 minutes.

3. Temporary Humidity Control
    a. The HVAC Contractor shall provide all necessary equipment to maintain an interior relative humidity level of not greater than 60%.

E. Additions and Renovations
1. General Requirements:
    a. The Owner will permit the use of existing HVAC systems to supplement temporary HVAC requirements.
    b. All necessary interruptions to, mains, risers, branches, or equipment, shall be scheduled with the Construction Manager and the Owner.
    c. The Owners existing HVAC system as indicated above, the HVAC Contractor shall supply temporary heat to the existing building under renovation by an external source.
2. Temporary Heat:
    a. The HVAC Contractor shall provide temporary heat between September 15th and May 15th of each year.
        i. Provide gas / propane fired heaters, inline blowers as required, including hoses and/or temporary piping, hook-ups, maintenance, service, removal and cost of fuel. Units are to be sized to maintain the temperature within the temporary enclosure between 55 and 60 degrees Fahrenheit.
        ii. Create and maintain a temporary heat and humidity log in a format acceptable to the Construction Manager. Temperatures and humidity levels shall be taken at a minimum of twice daily; in the early morning and late afternoon. These reports shall be submitted to the Construction Manager with the Contractor's daily work reports.
3. Temporary Ventilation and Exhaust:
    a. Work areas shall be maintained at a negative pressurization with respect to adjacent occupied areas.
    b. The HVAC Contractor shall provide portable high-performance fans for work areas, and when deemed necessary, positive pressurization devices (supply air fan units with high efficiency filters) for occupied areas.
    c. If fumes and or construction dust is detected in Owner occupied areas of the building, the Construction Manager will order the HVAC Contractor to increase the amount of air being exhausted from an area under construction, or increase the positive pressure in an occupied area, using additional fan equipment at no additional cost to the Owner.
    d. Size temporary air systems to supply a minimum of one complete air change every 120 minutes.
4. Temporary Humidity Control:
    a. The HVAC Contractor shall provide all necessary equipment to maintain an interior relative humidity level of not greater than 60%.

3.15 TEMPORARY USE OF ELEVATORS FOR HOISTING OR WORKERS

A. No existing or new elevators shall be used for transportation of materials or workers.

3.16 TEMPORARY COVERED WALKWAYS

A. The General Construction Contractor shall provide, maintain, repair, relocate, and remove temporary non-tubular scaffold type covered walkways at points of entry and egress as directed by the Construction Manager. Roof shall be covered with waterproof material where exposed to

weather. Enclose sides of walkways with adequate materials where exposed to construction activities. Coordinate locations of walkways with all other trades and relocate as required.

3.17 TEMPORARY STAIRS AND RAILINGS

A. The Roofing Contractor shall provide a minimum of six (6) temporary stair tower for access to all levels of all buildings, including roof access as directed by the Construction Manager.

B. The General ConstructionContractor shall provide and maintain a minimum of two (2) line safety cable at perimeter of all floors, roofs, balconies, leading edges, openings and shafts, etc. for all Trades during steel erection. Provide at least one (1) 4' – 0" OSHA protected opening per floor level for ladder access and one (1) 10' OSHA protected opening per floor level for material deliveries. Coordinate location of openings with Construction Manager. The General Construction Contractor will remove all safety cabling as coordinated with the Construction Manager.

C. The General Construction Contractor shall provide, maintain and eventually remove all temporary stairs, ramps, railings, and platforms, at all exterior exits to maintain emergency egress as directed by the Construction Manager.

D. The Roofing Contractor shall provide temporary guardrails and toe boards at all leading edge conditions for all roofing work.

3.18 TEMPORARY POWER AND LIGHTING

A. The Electrical Contractor shall provide and maintain up to two (2) 200A (120/208V) (3) phase - four wire temporary electrical service throughout all areas of the project during the entire construction phase for use by all Trade Contractors. All costs associated with utility usage shall be the responsibility of the Electrical Contractor. Provide temporary construction power for building areas utilizing temporary power distribution panels centrally located for all Trade Contractors use.

1. Provide all conduit, wire, transformers, panelboards, circuit breakers, etc. necessary to establish and maintain temporary electrical services. Coordinate the locations to minimize the need to relocate temporary panels. All costs associated with relocation are included in the base bid.
2. All temporary power distribution equipment shall utilize lockable covers, handles, or branch devices.
3. Include temporary power connections for mason's wet saw(s), temporary sump pumps, and fire proofing equipment, as required.
4. No connections of electric welders to any building services shall be permitted.
5. Each Contractor must supply drop cords, extensions and ground fault interrupters for their own work.
6. If needed, provide temporary power to elevator for installation and testing should permanent power not be available.

B. The Electrical Contractor shall provide, maintain, and remove all temporary lighting throughout all areas of the project during the entire construction phase for use by all Trade Contractors.

1. Lighting should be in accordance with OSHA minimum requirements.
2. Temporary light bulbs and any damaged temporary lights shall be replaced on a daily basis.

3. Install temporary site security related lighting at the enclosed construction laydown, perimeter building lighting, and office trailer area. Maintain existing building mounted, exterior lighting that may be disrupted during the course of the project.
4. Provide illuminated “Exit” signs and emergency lighting at all exits and stairways to maintain identification of exit routes within, around, and / or through the work area.
5. Provide temporary lighting for all stairways and covered walkways, as required.
6. Special temporary lighting such as for painting or other operations, which require more than the standard temporary overhead lighting, shall be the responsibility of the Contractor requiring the same.
7. Provide temporary pole mounted security lighting at construction field offices and remove at end of project as directed by Construction Manager.

C. The Electrical Contractor shall provide all temporary electrical connections to all existing, relocated, temporary and new heating units that the HVAC Contractor will be using to provide temporary heat and to any temporary or permanently installed equipment or systems installed by other Prime Contractors.

D. The Electrical Contractor shall provide self regulating heat trace on a dedicated circuit to protect the temporary water system, as required.

E. The Electrical Contractor shall provide temporary power & data to the Construction Manager’s office location at Homer Bus Garage Room 80 – Carpentry.
   1) Provide and install High Speed Broadband Internet Service (Road Runner Business Class or equal) to the Construction Manager’s office at Homer Bus Garage Room 80 – Carpentry. Electrical Contractor shall pay for set-up all monthly fees throughout the duration of the project and return all associated equipment at the direction of the Construction Manager at the end of the project.
   2) Provide (4) four circuits (30’ length of run) from existing panel in Homer Bus Garage Room 80 – Carpentry to adjoining Carpentry Room. Surface mounted raceway is acceptable. Locate receptacles per Construction Manager’s direction.
   3) Provide (4) CAT5E data locations from Time Warner service to locations designated by Construction Manager at Homer Bus Garage Room 80 – Carpentry, scope shall include access, supply, connection and all associated monthly charges for the duration of the project.

F. Construction Laydown / Staging Areas: Make application and all arrangements with the local utility company required for the installation of a 200 ampere, three phase, four wire120/208 volt temporary service to the property for use during the construction stage of the project for the field offices. Provide main disconnect switch and main load center in a locked weatherproof enclosure, and all necessary poles, supports, guy wires, service drops, properly installed and supported clear of construction equipment and traffic. Service shall include temporary connection to the existing transformer, temporary service run, installation of utility pole with load center mounted on it and as directed and located as the Construction Manager. Coordinate temporary site power panel with Construction Manager and begin work immediately upon Contract award.

G. Electrical Contractor has the option to install this temporary service above ground on poles or underground encased in PVC conduit. The Electrical Contractor shall pay for all costs associated for this temporary power as part of the Base Bid, including disconnect switches, panels, poles, wires, conduit, transformer as sized by local utility, etc. as well as any associated site work involved for the underground option.

H. Overhead wires shall be a minimum height of 18 feet above the finish grade at their lowest point with shielding over areas of vehicular access or provide underground conduit and wiring.

I. The Electrical Contractor shall remove all temporary electrical services, materials, equipment, poles, etc. at the end of the project or as and when directed by the Construction Manager. Return all circuitry and other conditions to their original conditions and location prior to the start of the project.

J. Comply with the National Electrical Code, OSHA and applicable local codes and utility regulations.

K. Do not overload circuits. Verify capacity of circuit prior to use. All receptacles to be GFCI protected.

L. No temporary power will be supplied for construction trailers or other temporary structures that the contractor(s) require at any of the project sites unless specifically indicated.

M. Each Contractor shall provide their own temporary power and lighting prior to the installation of the temporary electrical service and / or to areas of the site that electrical power does not exist.

3.19 TEMPORARY PHONES

A. Each contractor will make their own provisions as they require at their own expense and independent from the Owner's phone system from a phone service in the vicinity of the construction trailer staging area.

3.20 TEMPORARY CONSTRUCTION MANAGER OFFICE

A. The General Construction Contractor shall provide 30LF of 10' High temporary Partition Type 3 walls for Construction Manager Office to be located a Homer Bus Garage Room 80 – Carpentry. The General Construction Contractor shall provide 2 each interior doors, locking hardware and hollow metal frames as located by Construction Manager.

B. Construction Management Office Equipment & Furniture: General Construction Contractor' shall provide temporary Construction Manager's Office with all related equipment and furniture.

1. Three (2) 36" W x 96" L plan table surfaces to be installed per CM direction.
2. Provide one (1) mobile plan rack and twelve (12) 36" clamps equal to Safco model number 5060.
3. Three (3) Staples Burlston Luxura Managers Chair, Black.
4. Provide 32 lf x 12" wide shelving, to be installed per CM direction.
5. Four (4) 30" x 96" folding conference tables equal to Flash Furniture 30"W x 96"L Plastic Bi-Folding Table, Granite White.
6. Sixteen (16) folding chairs.
7. Two (2) 30" x 60" folding worktables equal to Flash Furniture 60" x 30" Plastic Rectangular Folding Table, Granite White.
8. Four (4) trash baskets.
9. Provide bottled water service (hot & cold) for duration of the project with cup supply.
10. The following computer equipment to be purchased by LeChase and be reimbursed by the General Construction Contractor:

a. One (1) Lenovo X240 Ultraportable Laptop Computer with 12.5" screen, 4GB RAM, 180 GB Solid State HD, 3.3lbjs, Docking station, Adapter Cable, Wireless Mouse and Keyboard, 22" Monitor, carrying case, speaker bar and external RW DVD Drive. Computer is to be pre-loaded with MS Office 2010 Professional (Word, Excel, Powerpoint, Etc.) and Adobe Acrobat XI or greater and Primavera P6. Operating system shall be Windows 8.1.
b. One (1) Lenovo T440 Standard Laptop with 14" screen, 4 MB RAM, 180 GB RAM, 180 GB SSD Hard Disk Drive, docking station, keyboard, mouse, 22" monitor and carrying case and external RW DVD Drive. Computer is to be pre-loaded with MS Office 2010 Professional (Word, Excel, Powerpoint, Etc.) and Adobe Acrobat XI or greater.
c. One (1) Brother MFC-J6720DW (10ft. USB Cable, Toner)

11. Lease and provide service warranty for duration of the project, one (1) Xerox copier or equal with ability to print, scan, email, sort, collate, reduce and enlarge. Must handle paper up to 11x17 and be capable of making double-sided copies. Copier shall have Bluetooth / wireless capabilities.
12. Include a Service/Maintenance Contract for materials and labor for the copy machine for project duration.
13. Provide AT&T CL82313, 3 Handset Cordless Telephone with Answering System/Caller ID/ Call waiting.
14. Provide one (1) digital camera complete with case, rechargeable batteries, charger and SD card. Model to be equal to Canon PowerShot ELPH 135 Digital Camera.
15. Provide and install two (2) type 20# ABC type fire extinguishers with wall mounts.
16. Zee first aid "First Responder Kit," with carry bag and refills for the duration of the project.
17. The General Construction Contractor shall hang banners and signs as directed by the Construction Manager. Banners will be provided by others.

B. The General Construction Contractor shall provide weekly independent janitorial services to the Construction Manager's office. This will include but not be limited to general dusting, emptying of trash cans, disposal of trash, vacuuming, washing and periodically waxing floors, cleaning of restroom and fixtures and washing windows.

C. At the conclusion of the project, the General Construction Contractor is to turn over the office furniture, computers, printers, software, related computer and printer cables and digital camera to the Owner for their use. All other items shall be removed at the conclusion of the project and when directed by the Construction Manager.

D. Contact Lee Stepp at M 607.327.1887 or John Putnam at 315.314.0853.

PART 4 - EXECUTION

4.1 GENERAL

A. Temporary facilities shall be installed in accordance with applicable codes, or as directed by the Construction Manager.
B. Maintain temporary facilities throughout the construction period.
C. Contractor installing temporary facilities shall be responsible to remove them when they are no longer required or when directed by the Construction Manager.
D. Repair damage to the project site caused by the installation of temporary facilities, or as directed by the Construction Manager.

E. Any temporary protection that is removed by a Trade Contractor in order to undertake and / or complete their work shall be reinstalled in its original form following the completion of the Work.

4.2 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Each Prime Contractor shall provide facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

END OF SECTION

SECTION 01 51 10

LIFE SAFETY REQUIREMENTS DURING SCHOOL CONSTRUCTION

PART 1 GENERAL

1.1 SAFETY AND SECURITY STANDARDS

A. Each contractor shall adhere to and be responsible for but not be limited to the life safety requirements stated in this section.

B. General safety and security standards for construction projects:
   1. Comply with Regulations of the Commissioner of Education Section 155.5 Uniform Safety Standards for School Construction and Maintenance Project.
   2. All construction, reconstruction and Renovation work shall be performed in a manner to protect the workers and public from injury. Adjoining property and structures shall be protected from damage at all times by the Contractor(s).
   3. All construction materials shall be stored in a safe and secure manner.
   4. Fences around construction supplies or debris shall be maintained.
   5. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
   6. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent unauthorized entry.

1.2 SEPARATION

A. Separation of construction areas from occupied spaces.
   1. Construction areas that are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas by code compliant construction.
   2. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants.
   3. Gypsum board on metal studs must be used in exit ways or other areas that require fire rated separation.
   4. Heavy-duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
   5. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.
   6. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
   7. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
   8. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday utilizing HEPA filtered vacuum system.

1.3 VENTILATION

A. Mechanical Contractor shall provide temporary exhaust ventilation to maintain indoor air quality.
   1. Provide an exhaust air system for the active project areas. Exhaust layout and capacities shall be adequate for removal of VOC's, off-gases, gases, dusts, mists, or other

emissions. Points of intakes and discharges shall be field determined to protect student occupied areas. Exhaust systems shall terminate at the building exterior.

2. Objective:
   a. Maintain a negative pressure between the work area and student occupied areas
   b. Before start of work, submit a proposed layout for the exhaust air system. Do not begin work until approval of the Architect, Engineer, and owner is obtained. Indicate on submission locations of fans, intake points, CFM capacities and electrical requirements. Electrical contractor shall furnish power wiring to temporary equipment.
3. System operation requirements:
   a. Provide sufficient quantity of exhaust fans in existing window openings or other approved locations to eliminate pockets of stagnant contaminated air. Capacities for equipment shall be operated in accordance with the following standards:
   b. System operation:
      1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated in accordance with the following standards:
         (a) Provide one work place air change every 15 minutes.

To calculate total air flow requirement:

$$\frac{\text{TOTAL FT/3 MIN}}{\text{15 MINUTES}} = \text{VOLUME OF WORK AREA (IN FT3)}$$

To calculate the number of units needed for the work area:

$$\text{NUMBER OF UNITS NEEDED} = \frac{\text{TOTAL FT3/MIN}}{\text{(CAPACITY OF UNIT IN FT3/MIN)}}$$

      2) Work area shall be defined as phased zone ie. R-1.
      3) Exhaust air system shall operate for a minimum of 72 hours after work is completed, or until all materials have cured sufficiently as to stop off-gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
      4) Maintain clearance from all temporary exhaust outlets to all active building areas. Exhaust duct locations shall be approved by Architect/Engineer.

1.4 EXITING

A. Required building exiting shall be maintained at all times so that there are no dead end conditions or corridor pockets greater than 1 1/2 x the corridor or pocket width.

B. The General Contractor, at each building, shall provide temporary exits and related construction as required in the Construction Drawings.

1.5 FIRE AND HAZARD PREVENTION

A. Areas of buildings under construction that are to remain occupied shall maintain a Certificate of Occupancy. In addition, all requirements itemized on the Fire Safety Inspection Report shall be in compliance during periods of student or staff occupancy; the following shall be strictly enforced.
   1. No smoking is allowed on public school property, including construction areas.
   2. During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris do not block fire exits or emergency egress windows. Each Contractor shall promptly move any

or all construction debris, materials and/or equipment as required to maintain existing passages at all times and clear during student or staff occupancy.

3. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the duration of the project.

1.6 NOISE ABATEMENT

A. Construction activities and operations shall not produce noise in excess of 60 dBA in occupied spaces. If noise levels in occupied classroom spaces exceed 60 dBA the Contractor exceeding this limit shall provide acoustical abatement procedures or schedule activities during unoccupied times. Each Contractor is advised that the School District may schedule "no work" periods during the project. Such schedules shall not impact the Construction Schedule or Budget.

1.7 HAZARD CONTROL

A. The Contractor shall take every precaution to eliminate the potential of construction fumes entering the occupied building. The Contractor shall take care to assure fresh air intakes do not draw construction related fumes into the building.

B. Each Contractor shall provide for "off-gassing" of volatile organic compounds introduced during construction before occupancy. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which "off-gas" chemical fumes, gases, or other contaminants shall be aired out in a well-ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended "off-gassing" periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The work areas must be properly ventilated and the material must be given proper time to cure or "off gas" before re-occupancy.

C. Each Contractor shall maintain the Manufacturer's Safety Data Sheets (SDS) (Formerly MSDS or Material Safety Data Sheets) at the site for all products used in the project. SDS sheets shall be provided to the School District when requested. SDS indicate chemicals used in the product, product toxicity, and typical side effects of exposure to the product and safe procedures for use of the product.

D. Asbestos abatement protocols. All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56(12 NYCRR 56), and the federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; downloading and reading at the Department of Housing and Urban Renewal, 451 7th Street SW, Washington, DC 20410, (202) 401-0388, web site; www.hud.gov/search.html, scroll web page to Reading Room, click on Bookshelf 10: Lead Paint). Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be performed in unoccupied areas of an occupied building in accordance with the above referenced regulations. For more information on Asbestos Abatement see Section 02 21 10 Asbestos Abatement.

E. Lead Based paint: Lead based paint has been identified as being applied to some building components that are to be selectively demolished. Lead based paint testing has been performed and a report is on file and available for review and use. It is the Contractor’s

responsibility to become familiar with areas containing lead based paint and to communicate the presence of lead based paint to all employees.

1. Effective April 22, 2010 all contractors are required to conform to the Environmental Protection Agency's (EPA) Lead Renovation, Repair and Painting (RRP) program. This regulation has been developed to prevent lead contamination when performing renovation, repair and painting projects which disturbs lead based paint in homes, child care facilities and schools built before 1978 if these buildings are visited regularly by any child under 6 years of age.
2. Any abatement work required shall be performed by a certified firm employing workers trained and certified for lead based paint activities. All work is to be performed in accordance with all applicable regulations including: 40 CFR 745 (USEPA), 29 CFR 1926 (OSHA), (HUD) Federal Housing and Urban Development Regulations and New York State Education Department requirements.
3. All contractors involved with lead based paint activities shall be certified in lead-safe practices as detailed in the Code of Federal Regulation 40 CFR, Part 745.
4. Contractors must document compliance with this requirement. EPA's <http://www.epa.gov/lead/pubs/renovaterightbrochuresp.pdf>may be used for this purpose.
5. For more information regarding this regulation visit the EPA website at www.epa.gov/lead/pubs/renovation.htm for requirements.
6. A summary of the lead-based paint testing report is attached to the end of this section.
7. Should paint suspected of containing lead, but not identified within the report be encountered, do not disturb the suspect material, and immediately notify the Architect.

F. (PCB) Polychlorinated Biphenyl: Locations of PCB containing window and door sealants have been identified on the contract drawings. Where present, PCB contaminated window and door sealants shall be removed and disposed of in accordance with U.S. E.P.A. Toxic Substances Control Act 40 CFR 761. Disposal of contaminated material shall also conform to the NYSDEC solid waste regulations (6NYCRR Part 360) if concentrations are less than 50 ppm and in accordance with (6NYCRR370-373 if concentrations are 50 ppm or greater. PCB sampling has been performed and a copy of the test reports for contaminated materials is included at the end of this section. It is the contractor's responsibility to become familiar with areas contaminated with PCB and to communicate the presence of contaminated materials to all employees. Should a material suspected of being contaminated by PCB, but not identified within the report be encountered, do not disturb the suspect material, and immediately notify the Architect.

1.8 POST CONSTRUCTION INSPECTION

A. Each Contractor is advised that the School District shall be provided the opportunity for a walk-through inspection by the School District's health and safety committee members to confirm building safety during construction and that the area is ready to be reopened for occupancy.

END OF SECTION

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
HOMER ELEMENTARY SCHOOL

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Homer Elementary School
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Homer Elementary School in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Homer Elementary School in Homer, New York. This school consists of an original section constructed in 1925, with an addition constructed in 1950. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on June 28 – June 30, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 620 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 620 XRF samples collected throughout the school, approximately 8% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below by construction vintage. These components should be considered positive throughout each applicable construction vintage. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings.

Summary of Components Treated with Lead-Based Paint
1925 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Floor	Concrete	N/A	Silver, Green
Wall	Plaster	Wall (below chair-rail)	All Colors
Interior Stairs	Metal	Stringer & Baluster	Green
Door	Wood	Casing	Varnished
Exterior Door	Metal	N/A	Brown
Exterior Window	Metal	Casing (original)	White

Summary of Components Treated with Lead-Based Paint
1950 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Floor	Concrete	N/A	Red, Green
Wall	Metal	Baseboard	Black
Wall	Brick	N/A	Yellow, Green
Exterior Stairs	Metal	Baluster	Brown
Exterior Window	Metal	Casing (original)	White

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows; 5=1925, 0=1950. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Classroom 220	1925	<7.50	50
FLOOR-2	Classroom 218	1925	<7.50	50
FLOOR-3	Classroom 305	1925	<7.50	50
FLOOR-4	Classroom 303	1925	<7.50	50
WIN-1	Classroom 220	1925	<7.50	400
WIN-2	Classroom 218	1925	<7.50	400
WIN-3	Classroom 305	1925	9.38	400
WIN-4	Classroom 303	1925	12.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
HOMER SENIOR HIGH SCHOOL

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Senior High School
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Senior High School in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Senior High School in Homer, New York. This school consists of an original section constructed in 1949, with an addition constructed in 1960. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on July 5 – July 7, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 750 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 750 XRF samples collected throughout the school, approximately 3% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below by construction vintage. These components should be considered positive throughout each applicable construction vintage. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings. No components sampled in the 1960 construction vintage were determined to be treated with lead-based paint.

Summary of Components Treated with Lead-Based Paint
1949 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Structural Support	Metal	I Beam	Yellow, White
Wall	Brick	N/A	All Colors
Interior Stairs	Metal	Stringer & Baluster	Green
Exterior Window	Metal	Casing (original)	Yellow

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows;

9=1949, 0=1960. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Weight Room	1949	<7.50	50
FLOOR-2	Classroom 49	1960	<7.50	50
FLOOR-3	Bathroom	1949	<7.50	50
FLOOR-4	Classroom 218	1949	<7.50	50
WIN-1	Weight Room	1949	<7.50	400
WIN-2	Classroom 49	1960	<7.50	400
WIN-3	Classroom 105	1949	<7.50	400
WIN-4	Classroom 218	1949	<7.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
HOMER INTERMEDIATE/JUNIOR HIGH SCHOOL

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Intermediate/Junior High School
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Intermediate/Junior High School in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Intermediate/Junior High School in Homer, New York. This school consists of an original section constructed in 1966, with an addition constructed in 1974. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on July 17 – July 19, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 730 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 730 XRF samples collected throughout the school, < 1% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below by construction vintage. These components should be considered positive throughout each applicable construction vintage. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings.

Summary of Components Treated with Lead-Based Paint
1974 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Stairs	Metal	Railing	Green
Door	Wood	N/A	Green

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows; 6=1966, 4=1974. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Classroom 160	1974	<7.50	50
FLOOR-2	Classroom 103	1966	<7.50	50
FLOOR-3	Classroom 258	1974	<7.50	50
FLOOR-4	Classroom 212	1966	<7.50	50
WIN-1	Classroom 160	1974	<7.50	400
WIN-2	Classroom 103	1966	<7.50	400
WIN-3	Classroom 258	1974	<7.50	400
WIN-4	Classroom 212	1966	<7.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
BUS GARAGE AND MUSIC ANNEX

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Bus Garage and Music Annex
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Bus Garage and Music Annex in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Bus Garage and Music Annex in Homer, New York. This facility was constructed in 1950. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on July 10, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 130 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 130 XRF samples collected throughout the school, approximately < 1% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below. These components should be considered positive throughout the building. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings.

Summary of Components Treated with Lead-Based Paint
1950 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Structural Support	Metal	I Beam	Blue

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows; 0=1950. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in

Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Music Room	1950	<7.50	50
FLOOR-2	Music Room	1950	<7.50	50
FLOOR-3	Music Room	1950	<7.50	50
FLOOR-4	Office	1950	<7.50	50
WIN-1	Music Room	1950	<7.50	400
WIN-2	Music Room	1950	<7.50	400
WIN-3	Music Room	1950	<7.50	400
WIN-4	Office	1950	<7.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

SECTION 01 57 13
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.2 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.

B. Section 31 22 00 - Grading: Temporary and permanent grade changes for erosion control.

C. Section 32 11 23 - Aggregate Base Courses: Temporary and permanent roadways.

D. Section 32 92 19 - Seeding: Permanent turf for erosion control.

1.3 REFERENCE STANDARDS

A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014 (Reapproved 2018).

B. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2017.

C. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015.

D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2016.

F. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2017.

G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; Current Edition.

H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; 1995.

I. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service; 2015.

1.4 PERFORMANCE REQUIREMENTS

A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP), whether the project is required by law to comply or not.

B. Also comply with all more stringent requirements of the State of New York Erosion and Sedimentation Control Manual.

C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; confirm with Owner..

D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

J. Open Water: Prevent standing water that could become stagnant.

K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Mulch: Use one of the following:
   1. Straw.
   2. Wood waste, chips, or bark.
   3. Erosion control matting or netting.

B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

C. Compost Silt Sock: 5mm thick continuous HDPE filament, tubular knitted mesh with 3/8 inch openings.
   1. Compost: Use only mature compost that has been certified by the U.S. Composting Council's seal of Testing Assurance Program and meets the specifications provided .
   2. Use 2" x 2" hardwood stakes.
   3. Diameter: Refer to Erosion & Sedimentation Plan Engineering Drawings.
   4. Refer to New York State Standards and Specifications for Erosion and Sediment Control (NYS Bluebook), Page 5.7 for more detailed information.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.2 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.3 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 50 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences, compost filter socks, or straw bales.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
c. Along the toe of cut slopes and fill slopes.
d. Across the entrances to culverts that receive runoff from disturbed areas.

2. Space sediment barriers with the following maximum slope length upslope from barrier:
a. Slope of Less Than 2 Percent: 100 feet..
b. Slope Between 2 and 5 Percent: 75 feet.
c. Slope Between 5 and 10 Percent: 50 feet.
d. Slope Between 10 and 20 Percent: 25 feet.
e. Slope Over 20 Percent: 15 feet.

D. Soil Stockpiles: Protect using one of the following measures:
1. Cover with polyethylene film, secured by placing soil on outer edges.
2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw.

E. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.

F. Temporary Seeding: Use where temporary vegetated cover is required.

3.4 INSTALLATION

A. All Erosion and Sedimentation Control Measures shall be installed in accordance with the approved E&S Plans.

B. Compost Filter Socks:
1. Locate/mark any utilities.
2. Check all permits.
3. Obtain compost meeting specifications.
4. Obtain filter sock netting.
5. Fill filter sock netting with compost.
6. Mark out area for filter sock; install sock parallel to contour lines so that the runoff enters as sheet flow.
7. In high-flow or steep-slope areas, orient a second sock parallel to the first to dissipate flows.
8. Lay filter sock with compost.
9. Stake filter sock every 10 ft. Stakes should be driven through the center of the sock, and 1 ft into the ground.
10. If sock netting must be joined, fit beginning of the new sock over the end of the old sock, overlapping by 1-2 ft. Fill with compost; then stake the joint.

C. Mulching Over Large Areas:
1. Dry Straw: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.
2. Wood Waste: Apply 6 to 9 tons per acre.
3. Erosion Control Matting: Comply with manufacturer's instructions.

D. Mulching Over Small and Medium Areas:
1. Dry Straw: Apply 4 to 6 inches depth.
2. Wood Waste: Apply 2 to 3inches depth.
3. Erosion Control Matting: Comply with manufacturer's instructions.

E. Temporary Seeding:
1. When hydraulic seeder is used, seedbed preparation is not required.
2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.

3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
5. Incorporate fertilizer into soil before seeding.
6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
8. Repeat irrigation as required until grass is established.

3.5 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Compost Silt Socks
1. Inspect filter socks periodically, and especially after large storm events. Ensure that the filter sock is intact, and that the area upstream has not filled with sediment. If the upstream area has filled with sediment, or if the filter sock has been overtopped, install additional filter socks further upstream. Sediment behind the sock should be removed when the depth of the sediment reaches 3.25-in. for an 8-in. sock, 4.75-in. for a 12-in. sock and 7.25-in. for an 18-in. sock. For socks with greater diameters, remove sediment behind the sock when the accumulated sediment depth reaches 40 percent of the design diameter of the sock.

D. Clean out temporary sediment control structures weekly and relocate soil on site.

E. Place sediment in appropriate locations on site; do not remove from site.

3.6 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General product requirements.

B. Sustainable design-related product requirements.

C. Re-use of existing products.

D. Transportation, handling, storage and protection.

E. Product option requirements.

F. Substitution limitations.

G. Procedures for Owner-supplied products.

H. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Lists of products to be removed from existing building.

B. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.

C. Section 01 40 00 - Quality Requirements: Product quality monitoring.

D. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

E. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.3 REFERENCE STANDARDS

A. 16 CFR 260.13 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; Recycled Content; Current Edition.

B. ASTM D6866 - Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis; 2018.

C. C2C (DIR) - C2C Certified Products Registry; Cradle to Cradle Products Innovation Institute; Current Edition.

D. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; 2014.

E. GreenScreen (LIST) - GreenScreen for Safer Chemicals List Translator; Clean Production Action; Current Edition.

F. GreenScreen (METH) - GreenScreen for Safer Chemicals Method v1.2; Clean Production Action; Current Edition.

G. ISO 14025 - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures; 2006.

H. ISO 14040 - Environmental management -- Life cycle assessment -- Principles and framework; 2006.

I. ISO 14044 - Environmental management -- Life cycle assessment -- Requirements and guidelines; 2006 (Amended 2017).

J. ISO 21930 - Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services; 2017.

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.5 QUALITY ASSURANCE

A. Bio-Based Content: Of vegetable or animal origin, not including products made by killing the animal.
   1. Determine percentage of bio-based content in accordance with ASTM D6866.
   2. Bio-based content must be sourced from a Sustainable Agriculture Network certified farm.

B. Cradle-to-Cradle Certified: End use product certified Cradle-to-Cradle v2 Basic or Cradle-to-Cradle v3 Bronze, minimum, as evidenced by C2C (DIR).

C. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
   1. Good: Product-specific; compliant with ISO 14044.
   2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
   3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
   4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.

D. GreenScreen Chemical Hazard Analysis: Ingredients of 100 parts-per-million or greater evaluated using GreenScreen (METH).
   1. Good: GreenScreen (LIST) evaluation to identify Benchmark 1 hazards; a Health Product Declaration includes this information.

2. Better: GreenScreen Full Assessment.
3. Best: GreenScreen Full Assessment by GreenScreen Licensed Profiler.
4. Acceptable Evidence: GreenScreen report.

E. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using one of the HPDC (HPD-OLT) online tools.

F. Manufacturer's Inventory of Product Content: Publicly available inventory of every ingredient identified by name and Chemical Abstract Service Registration Number (CAS RN).
1. For ingredients considered a trade secret or intellectual property, the name and CAS RN may be omitted, provided the ingredient's role, amount, and GreenScreen Benchmark are given.

G. Recycled Content: Determine percentage of post-consumer and pre-consumer (post-industrial) content separately, using the guidelines contained in 16 CFR 260.13.
1. Previously used, reused, refurbished, and salvaged products are not considered recycled.
2. Wood fabricated from timber abandoned in transit to original mill is considered reused, not recycled.
3. Determine percentage of recycled content of any item by dividing the weight of recycled content in the item by the total weight of materials in the item.
4. Determine value of recycled content of each item separately, by multiplying the content percentage by the value of the item.
5. Acceptable Evidence:
   a. For percentage of recycled content, information from manufacturer.
   b. For cost, Contractor's cost data.

H. Reused Products: Materials and equipment previously used in this or other construction, salvaged and refurbished as specified.
1. Wood fabricated from timber abandoned in transit after harvesting is considered reused, not recycled.
2. Acceptable Evidence: Information about the origin or source, from Contractor or supplier.

I. Source Location: Location of harvest, extraction, recovery, or manufacture; where information about source location is required to be submitted, give the postal address:
1. In every case, indicate the location of final assembly.
2. For harvested products, indicate location of harvest.
3. For extracted (i.e. mined) products, indicate location of extraction.
4. For recovered products, indicate location of recovery.
5. For products involving multiple manufacturing steps, provide a description of the process at each step, with location.
6. Acceptable Evidence:
   a. Manufacturer's certification.
   b. Life cycle analysis (LCA) performed by third-party.

J. Sustainably Harvested Wood: Solid wood, wood chips, and wood fiber certified or labeled by an organization accredited by one of the following:
1. The Forest Stewardship Council, The Principles for Natural Forest Management; for Canada visit http://www.fsccanada.org, for the USA visit http://www.fscus.org.
2. Acceptable Evidence: Copies of invoices bearing the certifying organization's certification numbers.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.
   1. See Section 01 10 00 for list of items required to be salvaged for reuse and relocation.

2.2 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:
   1. Made outside the United States, its territories, Canada, or Mexico.
   2. Made using or containing CFC's or HCFC's.
   3. Made of wood from newly cut old growth timber.
   4. Containing lead, cadmium, asbestos, or mercury.

C. Where other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 61 16.
   2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
   3. Are extracted, harvested, and/or manufactured closer to the location of the project.
   4. Have longer documented life span under normal use.
   5. Result in less construction waste. See Section 01 74 19
   6. Are made of vegetable materials that are rapidly renewable.
   7. Are made of recycled materials.
   8. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
   9. If bio-based, other than wood, are or are made of Sustainable Agriculture Network certified products.
   10. Are Cradle-to-Cradle Certified.
   11. Have a published Environmental Product Declaration (EPD).
   12. Have a published Health Product Declaration (HPD).

D. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

E. All electrical products, components and packaged systems are to be approved and labeled by a nationally recognized testing agency such as Underwriters Laboratory (UL) or equal.

F. Provide interchangeable components by the same manufacture for components being replaced.

G. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

H. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.3 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.4 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

3.2 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
1. Review Owner reviewed shop drawings, product data, and samples.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

K. Prevent contact with material that may cause corrosion, discoloration, or staining.

L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 61 16
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements for Indoor-Emissions-Restricted products.

B. Requirements for VOC-Content-Restricted products.

C. Requirement for installer certification that they did not use any non-compliant products.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 33 29.07 - Prohibited Content Installer Certification: Form for certifying that no non-compliant products were used.

C. Section 01 40 00 - Quality Requirements: Procedures for testing and certifications.

1.3 DEFINITIONS

A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Flooring.
   4. Composite wood.
   5. Products making up wall and ceiling assemblies.
   6. Thermal and acoustical insulation.
   7. Exterior applied products (for Healthcare and Schools projects only).

B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.

C. Interior of Building: Anywhere inside the exterior weather barrier.

D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.
   6. Solid wood flooring that is unfinished and untreated.

1.4 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).

C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

D. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).

E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

1.6 QUALITY ASSURANCE

A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
   2. Joint Sealants: SCAQMD 1168 Rule.
   3. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.
      b. 6 CRR-NY, Chapter III, Subpart A.
      c. SCAQMD 1113 Rule.
      d. CARB (SCM).

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination.

B. Examination, preparation, and general installation procedures.

C. Progress cleaning.

D. Protection of installed work.

E. System start-up.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Testing, adjusting and balancing.

J. Final cleaning.

K. Closeout procedures.

L. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.3 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

1.4 COORDINATION

A. See Section 01 10 00 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and

conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.4 PROGRESS CLEANING

A. All contractors shall be responsible for daily cleaning of work areas as described.

B. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

C. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

D. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

E. Collect and remove waste materials, debris, and trash/rubbish from site daily and dispose off-site; do not burn or bury.

3.5 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.

G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.6 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.7 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.8 TESTING, ADJUSTING AND BALANCING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.9 FINAL CLEANING

A. The General trades Contractor shall employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer’s instructions.

B. Execute final cleaning operations before requesting inspection for certification of Substantial Completion.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

C. Use cleaning materials that are nonhazardous.

D. Clean interior and exterior glass, including mirrors, door glass, windows, and surfaces exposed to view. Polish transparent and glossy surfaces.
   1. Remove temporary labels, stains and foreign substances.
   2. Remove glazing compounds and other substances that are noticeable vision-obscuring materials.
   3. Replace chipped or broken glass and other damaged transparent materials.

E. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

F. Clean exposed exterior and interior hard surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted and soft surfaces.

G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

H. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

I. Clean filters of operating equipment.

J. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even textured surface.

K. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
   1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
      a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
      b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
   3. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases, including but not limited to:
      a. Affidavit of Release of Liens on AIA Form G706-A:
         1) From Contractor
         2) From Subcontractor(s)
         3) From Major Material Supplier(s)
      b. Affidavit of Debts and Claims Payment on AIA G706:
         1) From Contractor
         2) From all tiers of Subcontractor(s)
      c. Consent of Surety on AIA G707 From Contractor.
      d. One (1) year warranty from date of Substantial Completion.
   4. Submit final record information.
   5. Complete final cleanup requirements, including touchup painting.
   6. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: Upon receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
   1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
   2. Results of the completed inspection will form the basis of requirements for final acceptance.

3.11 FINAL ACCEPTANCE

A. Each Contractor shall submit, prior to requesting final inspection, written certification that:

1. Work has been completed in accordance with contract documents, listing any exceptions.
2. Project has been inspected for compliance with contract documents.
3. Equipment and systems have been tested in the presence of the Construction Manager and are operational and video-taped instructions prepared and submittedthrough the Construction Manager to the Architect and Owner.
4. Owner's designated staff have been instructed on all equipment and systems and an Owner signed receipt furnished through the Construction Manager to the Architect.
5. Operational and Maintenance Manuals have been submitted through the Construction Manager and reviewed by the Architect.
6. Owner has been furnished the specified warranties, guarantees and spare parts and an Owner signed receipt furnished to the Architect.
7. Project has been completed and is ready for final inspection.

B. If the Architect and Construction Manager considers the work complete in accordance with the requirements of the Contract Documents, the Contractor will submit his final requisition (including final changes to the Contract Sum) together with the following through the Construction Manager to the Architect.
   1. AIA G706 - Contractor's Affidavit of Payments of Debts and Claims.
   2. AIA G706-A - Contractor's Release of Liens and Waiver of Liens.
   3. AIA G707 Consent of Surety to Final Payment.
   4. Evidence of continuing insurance coverage.

C. If the Architect and Construction Manager does not consider the work finally complete, the Contractor will be notified, in writing by the Architect with a copy to the Construction Manager, with the reasons stated.

D. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
   1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
   2. The Contractor shall achieve FINAL COMPLETION of all Work, including correction of punch list items, preparation and delivery of manuals, presentation of training and completion of final paper submissions not later than sixty (60) days following the Contract-scheduled Substantial Completion date. In the event the Contractor shall fail to achieve Final Completion in a timely manner in accordance with this provision, the Contractor and the Contractor's Surety shall be liable for and shall reimburse the Owner for any and all Architectural or Construction Manager fees, materials or expenses made necessary by the Contractor's failure. Additional fees and expenses shall be charged by the Owner against any Final Payment due or which may become due the Contractor.

3.12 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities. Refer to Section 01 78 00 - Closeout Submittals.
   1. Provide copies to Architect/Engineer.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Substantial Completion.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Accompany Project Coordinator on Contractor's preliminary final inspection.

H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

J. Submit final application for payment identifying total adjusted contract sum, previous payments and sum remaining due.

3.13 GENERAL REQUIREMENTS FOR MAINTENANCE SERVICE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 73 10
CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

B. Refer to Mechanical and Electrical Specification Sections for additional requirements and limitations on cutting and patching of mechanical and electrical work.

C. Each Prime Contractor shall refer to Specification Section 01 10 00 Summary of Work for additional Cutting and Patching requirements.

1.2 SUMMARY

A. This Section specifies the requirements for cutting, patching, demolition and alteration work without limiting the generality implied by the Specifications and Drawings. Refer to Section 01 10 00 for summary / scope of work.

B. Work of this Section applies to Each Prime Contractor and its Subcontractors. Prime Contractor and their Subcontractors shall provide required labor, materials, equipment, layouts, and other information for the cutting, patching, and alteration work shown, specified, or as implied to complete the work as described in this Specification Section or as indicated on the Contract Documents.

1.3 DEFINITIONS

A. Cutting and Patching covers adjustments to, and necessary reworking of, elements of construction in both new and existing work. The following definitions for cutting and patching apply to all Contracts.

1. **Cutting**: Physical modification of construction work, both new and existing, or removal of existing or installed materials necessary to permit installation or performance of other Work, including but not limited to; cutting, drilling, core-drilling, chopping, excavating, saw-cutting, trenching, backfill and compaction and other similar operations.

2. **Patching**: Restoration, replacement and installation of construction material, both new and existing, required to restore surfaces to original conditions and maintain fire rated assemblies after installation of other Work.

1.4 DESCRIPTION

A. Unless otherwise noted, each Prime Contractor shall be responsible for all cutting and patching, required in conjunction with the work of their contract and to:

1. Be familiar with all the Contract Documents, including other trades, to determine the extent of the cutting and patching requirements to be performed.
2. Ensure all components fit properly.
3. Remove out of sequence work installed prematurely.
4. Remove and correct defective work and work not conforming to requirements of Contract Documents.
5. Provide equipment, labor, materials, and incidentals necessary for cutting and patching as required for the installation of new work.

SECTION 01 73 10
CUTTING AND PATCHING

B. Coordination:
   1. Coordinate the installation of work with the work of other Contractors to minimize cutting and patching.

C. In addition to contract requirements, upon written instructions of the Construction Manager:

   1. All new work must be inspected prior to enclosing. If inspection has not been conducted, Contractor shall uncover newly installed work to provide for Construction Manager and Architect/Engineer's observation.

D. All Contractors shall bare the responsibility not to cut or otherwise alter the Owner's property or any separate Contractors' work except with the written consent of the Owner and of such separate Contractor. The Contractor shall not un-reasonably withhold from the Owner or any separate Contractor, consent to cutting or otherwise altering the work.

E. Each Contractor shall perform cutting and patching required for the installation of the work of their contract except where specifications or drawings specifically indicate otherwise. Each Contractor shall be responsible to review all the Contract Drawings for all trades to determine the extent of the cutting and patching that is required to install the work of their contract.

   1. Demolition, Cutting and Patching as indicated and as necessary to install new work in reconstruction areas of the existing building as indicated and in the new additions to the building as indicated.

   2. Salvage of Materials for reuse in the project, or where directed by the Construction Manager, salvage and delivery of specific items to Owner for its use where indicated or for use by Prime Contractor and Subcontractor for work of their trades as directed. The materials which are in good condition and which are specifically noted on the drawings for reuse in the project, shall be carefully removed and delivered to the Owner's Representative on the premises where directed, except for such items as the Owner may declare to be the Contractor's property to be legally disposed of offsite by the Contractor.

   3. Each Prime Contractor shall bear the cost of all cutting and patching required by and for the installation of their work unless otherwise indicated on the drawings or in the specifications. This shall include but not limited to the following:

      a. Cut existing architectural / structural components of the existing building as required for the installation of new work.

      b. Patch to match existing architectural / structural features after the new work has been installed by the contractor's work forces or work performed by other contractors.

      c. Any modification to structural components required for pipes or conduits to pass through will require approval by the Architect and Structural Engineer.

      d. Each Prime Contractor or their Subcontractor is responsible for the actual cutting, capping, removing, relocating or otherwise making safe equipment, systems, or components of the systems that relate to their Scope of Work.

      e. Drilling or core drilling shall be performed by the respective trade requiring it for the installation of their equipment, systems or components of their systems.

f. Review existing building conditions and access to install equipment in the required locations. Systems to be installed in any areas with difficult access may need to be provided in sections. If it is deemed necessary to perform cutting and patching to facilitate access to certain areas to systems, then the responsibility of cutting and patching shall be by the contractor responsible for that system.

g. Furnish and set all sleeves for penetrations in new and existing construction. Contractors shall provide the sleeves as specified, along with an accurate layout of the location of where these sleeves are to be placed. These sleeves shall be numbered, and that number shall correspond to the location of the sleeve shown on the layout drawing.

h. Fire safe all penetrations through fire rated construction created due to the work of their contract. All penetrations through rated construction shall be sealed fire safe by a UL listed approved method. Patching of fire rated assemblies shall be made using new materials equal to the fire rating of the new or existing assembly.

1.5 SUBMITTALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

B. Any modification to structural components will require approval by the Architect and Structural Engineer.

1.6 QUALITY ASSURANCE

A. **General:** Structural and other conditions shall be verified with the Architect before proceeding with cutting, demolition and alterations work. Inspect structures prior to start of Work and notify the Architect in writing of any conditions detrimental to the execution of the Work.

B. **Requirements for Structural Work:** Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

C. **Operational and Safety Limitations:** Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

D. **Visual Requirements:** Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

E. Costs caused by out of sequence work prematurely installed, defective work, or work not conforming to the Contract Documents, including costs for additional services of the Construction Manager and Architect/Engineer, will be paid for by the party responsible for out of sequence, rejected or non-conforming work.

F. **Miscellaneous Elements:** Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their

capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membrane and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise and vibration-control elements and systems.

1.7 WARRANTY

A. **Existing Warranties:** Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS FOR REPLACEMENT OF WORK REMOVED

A. Materials for each trade or specialty involved in alterations, cutting, and patching shall be furnished and installed as specified in the respective specification sections or as specifically indicated on the drawings.

B. Where materials and installation are required but not specified, use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials. Samples of material finish or color are required for Architect's approval.

C. Supplement relocated materials where required to complete work of the project with similar materials.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect existing condition of work, including elements subject to movement or damage during removal of adjacent materials.

1. Photograph existing damage, which could be misconstrued as damage resulting from the Work of this Contract. State location and date of photograph and file with the Architect prior to starting work.

B. After uncovering work, inspect conditions affecting installation of new products.

3.2 PREPARATION: PRIOR TO CUTTING

A. Provide shoring, bracing and support as required to maintain structural integrity of project.

B. Provide protection for materials on adjacent surfaces.

C. Provide protection when work will be exposed to the elements.

D. **Protection:** Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operation. Each Prime Contractor is responsible to cover and protect furniture, equipment, etc. not being used in rooms where furniture and equipment will remain during Contractor working hours.

E. Take all precautions necessary to avoid cutting existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

A. Remove and store in protected location, material, which is to be reused and relocated.

B. Cutting shall be done in a manner that will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance.

C. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.

D. Restore work, which has been cut or removed. Provide new products to complete work in accordance with requirements of Contract Documents.

E. Refinish entire surfaces as necessary to provide an even finish:
   1. Continuous Surfaces: to nearest intersections.
   2. Assembly: entire refinishing.

F. Fill and patch openings and holes in existing construction when bolts, piping, ducts, conduit and other penetrating items are removed.

G. **Visual requirements:** Do no cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

H. **Fire resistive integrity:** Where holes or gaps remain from removed elements, fill void using solid fire resistive materials full depth of structure; terminate below finishes to allow new finish to be installed (see patching). Maintain the fire resistive and structural integrity of the structures.

I. **Firestopping:** All products used for through-penetration firestop systems shall be tested and meet all federal, state, and local codes.

J. **Cutting:** cut existing construction use methods least likely to damage elements to be retained or adjoining construction. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.

   1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. To avoid marring existing surfaces, cut or drill from the exposed or finished side into concealed surfaces.
   3. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.

K. **Patching**: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Where removal of walls or partitions extends from one finished are to another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new.
4. Patching around piping and penetrations: Provide firestopping at perimeter of penetrations for smoke-tight seal to maintain integrity of fire resistive and smoke barrier qualities.
5. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.
6. Patch, repair, or rehang existing ceiling as necessary to provide an even plane surface of uniform appearance.

3.4 CLEANING

A. Daily cleaning of alteration areas of the building shall be the responsibility of each Prime Contractor.

B. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely, paint, mortar, oils, putty, and items of similar nature. Thoroughly clean piping, conduit, and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

C. Dust generated by cutting and patching shall be controlled in a manner so as to prevent infiltration into occupied spaces. Contractor(s) responsible for dust infiltrating the existing duct systems shall bare the cost of cleaning these systems.

D. Demolished Materials shall be removed from the project site at frequent intervals. Piles of demolished materials will not be allowed to accumulate.

END OF SECTION

SECTION 01 74 00
PROGRESS CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This section includes the requirements for clean up requirements.

1.3 DESCRIPTION
A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.

B. All occupied portions of the facility affected by the construction activity shall be cleaned at the close of each workday.

C. Upon Substantial Completion of Work, remove balance of waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all exposed surfaces; leave project clean and ready for occupancy.

1.4 SAFETY REQUIREMENTS
A. Standards: Maintain project in accord with safety and insurance standards.

B. Hazards Control
1. Store volatile wastes in covered metal containers and remove from premises daily.
2. Prevent accumulation of wastes that create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
1. Do not burn or bury rubbish and waste materials on project site.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION
A. Execute cleaning to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust. Erect dustproof barriers to keep dust from drifting through the building.

C. Each day Contractor shall affect the following:
1. Areas of intense activity, such as cutting and sawing must be swept clean and reorganized at the end of each day.

2. Areas of moderate activity such as installation of plumbing, ductwork, electrical work must be returned to good order at the end of each day.
3. Debris below scaffolds (and shoring/reshoring) must at all times, be kept sufficiently consolidated to keep walkways free of tripping hazards. These work areas must also be swept clean immediately upon removal of scaffolds.
4. All swept up debris, waste materials, and packing must be removed and/or placed in the dumpster by noon of the following workday.
5. All stored material must be kept in good order.
6. As portions of the work are completed, all used and excess materials must be removed promptly.
7. Daily clean-up and good housekeeping is the responsibility of each Contractor individually and will be monitored by the Construction Manager.
8. Contractors shall promptly comply with requests to organize scattered materials.
9. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.

D. Separate and recycle as required by local authorities and regulations.

E. Handle materials in a controlled manner with as few handling as possible; do not drop or throw materials from heights. The General Construction Contractor shall provide and maintain a trash chute at the existing buildings for use by all trades.

F. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

G. Excess concrete, block, terrazzo mix, mortar or grout is the responsibility of the Contractor to remove from the site.

H. Each Contractor working on site shall provide the Construction Manager with one worker as required by the Construction Manager to perform clean up at the site.

3.2 FINAL CLEANING

A. Each Contractor shall provide complete the final cleaning of all work installed under this Scope of Work, prior to acceptance by the Construction Manager and the Architect, and prior to the Owners occupancy.

B. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight exposed interior and exterior finished surfaces; polish surface so designated to shine finish.

C. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces

D. In preparation for substantial completion or occupancy, the Owner and Construction Manager will conduct an inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

E. Maintain cleaning until project, or portion thereof, is occupied by Owner.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood.
   5. Land clearing debris, including brush, branches, logs, and stumps.
   6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   7. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (http://flooring.dupont.com) and Interface (www.interfaceinc.com) conduct reclamation programs.

E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

F. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.
   3. Landfill Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.

c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

4. Incinerator Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
   c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.
   b. Amount, in tons or cubic yards.
   c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

A. See Section 01 60 00 - Product Requirements for substitution submission procedures.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
1. Prebid meeting.
2. Preconstruction meeting.
3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
1. Provide containers as required.
2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 77 00
PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the process and requirements for project closeout procedures for all Contractors.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor:
   1. Submit written notice through Construction Manager that Project, or designated portion of Project, is substantially complete.
   2. Submit list of major items to be completed or corrected and a list of all material to be turned over to the Owner.

B. Architect/Engineer in conjunction with Construction Manager will make an inspection within a reasonable time after receipt of notice.

C. Should Architect/Engineer consider that work is substantially complete:
   1. Architect/Engineer shall prepare and issue a Certificate of Substantial Completion, AIA G704, complete with signatures of Owner and Contractor, accompanied by Contractor's list of items to be completed or corrected, as verified, and amended by Architect/Engineer.
   2. Owner occupancy of Project or designated portion of Project:
      a. Contractor shall:
         i Cooperate with Construction Manager to obtain permanent/temporary certificate of occupancy.
         ii Perform final cleaning.
      b. Owner will occupy Project, under provisions stated in Certificate of Substantial Completion.
   3. Contractor shall complete work listed for completion or corrections prior to Owner occupancy.

D. Should Architect/Engineer consider that work is not substantially complete:
   1. Architect/Engineer shall immediately notify Construction Manager and Contractor, in writing, stating reasons.
   2. Contractor shall complete work and send second written notice to Architect/Engineer through Construction Manager, certifying that Project, or designated portion of Project, is substantially complete.
   3. Architect/Engineer will reinspect work.

1.4 FINAL INSPECTION PROCEDURES

A. Contractor shall submit written certification that:
   1. Contract Documents have been reviewed.
   2. Project has been inspected for compliance with Contract Documents.
   3. Work has been completed in accordance with Contract Documents.
   4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
   5. Project is completed and ready for final inspection.

6. Owner's designated staff have been instructed on all equipment and systems and an Owner signed receipt furnished to the Construction Manager
7. All project record documents "As-Built Drawings" have been submitted to the Architect/Engineer.
8. Operational and Maintenance Manuals have been submitted to the Architect/Engineer.
9. Owner has received the specified spare parts and maintenance items. A signed receipt by Owner representative shall be provided to the Architect/Engineer and/or Construction Manager.
10. All warranties and guarantees have been submitted to the Architect/Engineer.

B. Architect/Engineer will make final inspection within a reasonable time after receipt of certifications.

C. Should Architect/Engineer consider that work is not finally complete:
   1. Architect/Engineer shall notify Construction Manager and contractor, in writing, stating reasons.
   2. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice to Architect/Engineer through construction manager certifying that work is complete.
   3. Architect/Engineer will re-inspect work.

1.5 REINSPECTION COSTS

A. Should Architect/Engineer be required to perform second inspections because of failure of work to comply with original certifications of Contractor, Owner will compensate Architect/Engineer for additional services and deduct amount paid from final payment to Contractor.

B. All Contractors are required to complete all Substantial Completion Inspection Report "punch list" items and all "close out" requirements within 30 (thirty) calendar days after overall project substantial completion. If the Architect and Construction Manager are required to provide additional services, extend the duration of services to the Owner and/or perform additional inspections because the Contractor fails to comply with the requirements of the Contract, or the Contractor did not complete the work in accordance with the construction schedule, the amount of compensation paid to the Architect/Engineer and Construction Manager by the Owner for additional services shall be deducted from the final payment to the Contractor. If the Contractor does not complete the punch list work within 30 (thirty) calendar days after substantial completion, the Owner and Construction Manager retain the right to hire another Contractor to complete the punch list on a time and material bases and deduct the cost of completing this work and any and all other remaining punch list work items and deduct such cost from the Contractor's application for payment.

1.6 CLOSEOUT SUBMITTALS

A. Project Records Documents: Section 01 78 00.
Operating and Maintenance Data / Demonstration and Training: Section 01 78 00.
Warranties and Guarantees: Section 01 78 00

B. Spare Parts and Maintenance Materials: Conform to requirements of individual technical sections.

C. Deliver evidence of compliance with requirements of governing authorities.
   1. Certificates of Inspection
      a. Elevators.
      b. Plumbing
      c. HVAC

d. Electrical
    i. NYBFU
e. Others if required

D. Deliver Certificate of Insurance covering the warranty period as specified in the Contract Documents.

E. The Asbestos Abatement Contractor shall supply the following in addition to all other items listed herein:
1. Physical/Exams and Worker Acknowledgment.
2. All testing and lab results.
3. Transportation and disposal records.

1.7 FINAL APPLICATION FOR PAYMENT

A. Refer to Specification 01 29 00 – Payment Procedures for final application for payment requirements.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

D. Spare Parts and Maintenance Products

1.2 RELATED REQUIREMENTS

A. Section 00 72 14 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit draft of completed documents in electronic format 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit one hard copy set and one electronic copy on thumb drive of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   3. Field changes of dimension and detail.
   4. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

P. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.
      a. Source data.
      b. Product data, shop drawings, and other submittals.
      c. Operation and maintenance data.
      d. Field quality control data.
      e. Photocopies of warranties and bonds.
   4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

K. Electronic Format: Operation and maintenance data in electronic format shall be assembled and arranged as prescribed for hard copy manuals.
   1. All content shall be:
      a. In individual documents, using .pdf format.
      b. Organized into named folders.
      c. In a fully searchable format.
      d. Saved to high quality thumb drive.

3.6 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for

items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

3.7 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

END OF SECTION

SECTION 02 21 10
ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Laboratory reports with summary of bulk asbestos analysis results are available in the Architect/Certified Project Designer's office.

B. The contractor shall be responsible for investigating the site and verifying conditions and quantities prior to the submission of his bid. The contractor shall not be permitted changes in the contract amount if specific variances are denied by New York State Department of Labor, Architect/Certified Project Designer, or any other agency.

C. A site specific variance may be applied for at the contractor's cost. Use of a site specific variance requires approval of the Asbestos Abatement Project Designer.

1.2 REGULATORY REQUIREMENTS

A. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.

B. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

C. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

D. NYS DEC Title 6 NYCRR Part 360 - Solid Waste Management Facilities General Requirements; current edition.

E. NYS DEC Title 6 NYCRR Part 364 - Waste Transporters; current edition.

F. NYS DOH Title 10 NYCRR Part 73 - Asbestos Safety Program Requirements; current edition.

G. NYS DOL Title 12 NYCRR Part 56 - Asbestos; current edition.

H. USEPA Title 40 CFR Part 61 - National Emissions Standards for Hazardous Air Pollutants; current edition.

I. USEPA Title 40 CFR Part 763, Subpart E - Asbestos Containing Materials in Schools; current edition.

J. USEPA 530-SW-85-007 - Asbestos Waste Management Guidance; current edition.

1.3 SCOPE

A. All work of this section shall be performed in accordance with 12 NYCRR Part 56 as most currently amended unless permitted otherwise by the NY State Department of Labor, the USEPA and the Owner's Representative.

B. The contractor shall conform to Title 10 NYCRR Part 73 as most currently amended.

C. Furnish all labor, materials, licenses, facilities, equipment, services, employee training and testing, permits and agreements necessary to perform the work required for asbestos removal, encapsulation and enclosure in accordance with these specifications, the latest regulations from the U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Asbestos Hazard Emergency Response Act (AHERA), the State of New York, the recommendations of the National Institute of Occupational Safety and Health (NIOSH) and Standard 241 of the National Fire Protection Association (NFPA).

D. All work shall be performed in accordance with the U.S. Environmental Protection Agency (EPA) 40 CFR Part 763, Subpart E, AHERA Regulations for Removal of Asbestos in Schools; (EPA) 40 CFR Part 61, and OSHA Title 29 CFR, Part 1910; sections 1001, 134, 1926.2 and 1926.1200. All work shall also also be performed in accordance New York State Department of Health Title 10 NYCRR Part 73 and Deparment of Environmental Conservation Title 6 NYCRR Part 364

1.4 SUBMITTALS

A. Pre-Work Submittals: The Contractor shall submit to the Architect/Certified Project Designer three (3) copies of the documents listed below:
   1. Resume: Shall include the following:
      a. Contractor license issued by New York State Dept. of Labor.
      b. The number of years engaged in asbestos removal.
      c. Provide a list of projects performed within the past two years and include the dollar value of all projects. Provide project references to include owner, consultant, and air-monitoring firms' name, contact person, address, and phone number.
      d. An outline of the worker training course and medical surveillance program conducted by the contractor.
      e. Emergency plans, including proposed work area evacuation routes and fire extinguisher locations.

B. Citations/Violations/Legal Proceedings: Submit a notarized statement describing:
   1. Any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.
   2. Any Stop Work Orders issued on projects within the past two years.
   3. Any litigation or arbitration proceedings arising out of performance on past projects.
   4. Any liquidated damages assessed within the last two years.

C. Progress Schedule:
   1. Show the complete sequence of construction by activity and the sequencing of work within each building or section of the work.
   2. Show the dates for the beginning and completion of each major element of work including substantial completion dates for each work area, building, or phase.
   3. Show final inspection dates.

D. Site Specific Variance: Submit all proposed site specific variances for this project to the Architect for review and approval.

E. Schedule of Values: Prepare a schedule of values, as required by the General Conditions identifying the value of work, by work area, associated with each type of asbestos material included in the scope of work. Identify mobilization and administration costs separately.

F. Notifications: Submit notifications required by federal, state, and local regulations together with proof of timely transmittal to agencies requiring the notice (e.g. certified mail return receipt).

G. Permits: Submit copies of current valid permits required by state and local regulations, including arrangements for storage, transportation, and disposal of contaminated materials.

H. Abatement Work Plan: Provide plans which clearly indicate all work areas (numbered sequentially) including the locations and types of all decontamination chambers, entrances and exits to the work area, type of abatement activity/technique, number and location of negative air units and exhaust including calculations, and the proposed location and construction of storage facilities and field office.

I. Equipment: Submit manufacturer's information of vacuums, negative air pressure equipment, respirators, and air supply equipment, etc. Provide certification that all equipment meets applicable requirements of OSHA and EPA.

J. Worker Training and Medical Surveillance: The Contractor shall submit a list of the persons who will be employed by him and his subcontractors in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.

K. (Sub)-subcontractors List: The abatement (sub)-contractor shall submit a list of all sub-subcontractors to be used on the project.

L. Project Supervisor: Submit the resume of the proposed Project Supervisor. Identify work history and substantiate ability to supervise this project.

M. Rental Notifications: Submit copies of notices sent to rental suppliers informing them of the nature of the work that the contractor intends to use the equipment for.

N. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of asbestos containing materials; understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.

O. Project Closeout Submissions:
1. Submit copies of all waste disposal manifests, and disposal logs.
2. Submit OSHA compliance air monitoring records conducted during the work.
3. Submit copies of the daily progress log.
4. Submit copies of the visitor's log.
5. Submit Certificate of visual inspection obtained from the Project Monitor.
6. Submit a list of all employees utilized on the project with social security and Asbestos Handler Certificate numbers.
7. Submit copies of any required Employee Statements such as Medical Examination statement, Certificate of Worker's Release, or Employee Training Statement.
8. Submit 3 copies of a description of work to be included in the Owner’s AHERA Management Plan Building record. Indicate asbestos materials removed and quantities for each area(s) of abatement.

1.5 PROJECT SUPERVISOR

A. The Contractor shall designate a full-time Project Supervisor who shall be on-site at all times work is in progress. If the Project Supervisor is not on-site, all work shall be stopped. The Project Supervisor must be able to read and write English fluently, as well as communicate with his workers. The Project Supervisor shall remain until the project is complete and cannot be removed without the written consent of the Owner and the Architect/Certified Project Designer.

B. Prior to the commencement of work, the Contractor shall submit the proposed Project Supervisor's resume to the Owner and Architect/Certified Project Designer for approval. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.58 and shall have a minimum of one-year on-the-job training. This person shall hold certification as an Asbestos Project Supervisor.

1.6 ASBESTOS PROJECT MONITOR, AIR SAMPLING AND ANALYSIS FIRM

A. An Asbestos Project Monitor, Air Sampling and Analysis firm shall be retained by the Owner to provide abatement project inspection and monitoring services and to conduct air sampling and provide laboratory analysis of air samples. This firm is responsible for ensuring that all abatement activities are in full compliance with all applicable federal, state, and local laws, rules, and regulations, and the contract documents. Air sampling and analysis required by

OSHA regulations to be performed by the contractor shall be the responsibility of the contractor and will not be performed by the Air Sampling and Analysis Firm.

B. The Asbestos Project Monitor shall have personnel on-site at all times the contractor is on-site. The contractor shall not be permitted to conduct any work, including mobilization and preparation, unless the Asbestos Project Monitor consultant is on-site.

C. The Asbestos Project Monitor, and his on-site representative, shall have the authority to direct the actions of the contractor verbally and in writing to ensure compliance with the project documents and all regulations. The Asbestos Project Monitor shall have the authority to stop work when gross work practice deficiencies or unsafe practices are observed or ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.

D. The Asbestos Project Monitor shall provide the following functions:
   1. Inspections of contractor's work, practices, and procedures for compliance with all regulations and project specifications. Notify the Owner/Architect of contractor non-compliance during the project.
   2. Maintain a daily log on-site of all activities undertaken by the contractor, all visitors to the site, and any unusual events.
   3. The inspector shall turn over copies of all daily logs, air-monitoring results, and any other reports prepared in the field to the Architect/Certified Project Designer.
   4. Verify daily that all workers used in the performance of the project is certified by the appropriate regulatory agency.
   5. Monitor the progress of the contractor's work and report any deviations from the schedule to the Architect/Certified Project Designer.
   6. Monitor, verify, and document all waste load-out operations. The Project Monitor shall maintain a disposal log indicating the time, date, quantity, and destination (including hauler information) of all waste removed from the site.
   7. The Project Monitor shall ensure that the waste disposal procedures are being followed, including the use of container seals and the Authority's waste manifest.
   8. Verify that the contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
   9. Verify that all materials and equipment delivered to the site are in conformance with the contract documents and approved submittals.
   10. Ensure that all warning signs and notices required of the owner and the contractor are posted.
   11. Inspect each work area prior to abatement activities and document building damages prior to and after the abatement contractor performs the work.
   12. Inspect each work area to verify total asbestos abatement in accordance with the contract documents prior to clearance air sampling.
   13. Attend regular meetings to discuss project related issues.
   14. Deliver a bound final report to the Owner within 30 days of the completion of monitoring services which contains all project monitoring and air sampling documentation, credentials, an executive summary of the activities included in the report, and a statement that confirms that all monitoring and air sampling has been completed in compliance with New York State Department of Labor and Environmental Protection Agency regulations.
   15. The selected monitoring company shall NOT be permitted to provide testing and/or consulting services to the selected asbestos abatement contractor for any work on this project.

E. The Project Monitoring services have been contracted for Monday through Friday, 8 hours per day. The time lines that have been established are based on the Owner's needs and the Contractor completing the work with sufficient manpower, supplies and organization within the scheduled time. If more hours are needed due to a lack of the Contractor's ability to meet the scheduled time lines, the cost for additional Project Monitoring and Air Sampling shall be the responsibility of the contractor.

1.7 AIR SAMPLING REQUIREMENTS

A. Air Sampling shall be conducted as required by New York State regulations.

B. Unless otherwise required by applicable regulations, samples shall be analyzed by Phase Contrast Microscopy (PCM) and final clearance air samples by Transmission Electron Microscopy (TEM) as outlined by paragraphs below. Chain of Custody must be maintained for all samples.

C. Analytical services shall be provided by a laboratory certified by the New York State Department of Health Environmental Laboratory Approval Program specifically for the analytical procedure being used.

D. Air sampling shall be performed by an individual with at least six months experience in abatement project air sampling and shall hold certification as a New York State Asbestos Handler or Asbestos Project Air Sampling Technician as required by applicable New York State regulations.

E. The Asbestos Project Air Sampling Technician shall maintain a log on-site of all air monitoring conducted and the results of such monitoring.

F. The air sampling technician must have an adequate quantity of equipment required to conduct the necessary air monitoring, including a sufficient number of air sampling pumps as well as leaf blowers and fans required for aggressive clearance air monitoring.

G. To help maintain scheduled time lines, the work is divided into work areas for air monitoring as grouped below. Each area shall have separate pre, during and post abatement monitoring.

H. Pre-abatement air samples shall be collected before the contractor arrives on site.

I. During abatement samples shall be collected at locations selected by the PM/AST.

J. Inside air samples shall be collected by the PM/AST. These samples shall not be used to satisfy the contractor’s responsibility for personal sampling.

K. TEM and PCM final air samples shall be collected in the same locations as the pre-abatement air samples.

L. Required Inspections - The following minimum inspections shall be conducted by the Asbestos Project Monitor. Additional inspections shall be conducted as required by project conditions. Progression from one phase of work to the next by the contractor is only permitted with the written approval of the Project Monitor.
   1. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the work areas and to documents these conditions. It shall be conducted with the owner, Asbestos Project Monitor, contractor, and the Architect/Certified Project Designer (as appropriate) prior to release of the building to the abatement contractor.
   2. Pre-Commencement Inspection: The purpose of the inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the work area is fully prepped for removal.
   3. Work Inspections: The purpose of this inspection is to monitor the work practices and procedures employed on the project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the Asbestos Project Monitor during preparation and removal activities at least twice every work shift.
   4. Visual Clearance Inspection: The purpose of this inspection is to verify the contractor's certification that all materials have been removed from the work area and the absence of all visible accumulations of debris in the work area. This inspection shall be conducted after encapsulation and removal of all surface plastic in the area, but before final air clearance testing. Critical barriers shall remain in place.

5. Punch List Inspection: The purpose of this inspection is to verify the contractors' certification that all work has been completed as contracted and the condition of the existing area prior to its release to the owner.

1.8 MINOR ASBESTOS ABATEMENT PROJECT (LESS THAN OR EQUAL TO 25 LINEAR FEET OR 10 SQUARE FEET)(TENT/MINI ENCLOSURES)

A. Pre-abatement air sampling/during-abatement air sampling; In compliance with New York Sate Department of Labor approved specific variance.

B. Final clearance air sampling; In compliance with New York State Department of Labor approved specific variance and New York State Education Department Final Clearance Air Sampling clarification dated August 2007:
1. For areas up to Three (3) square feet or Three (3) linear feet; provide One (1) agressive air sample inside and One (1) standard air sample outside the work area plus required blanks. Analysis by TEM.
2. For areas over Three (3) square feet or Three (3) linear feet but less than Twenty-Five (25) linear feet or Ten (10) square feet; provide Five (5) agressive air samples inside and One (1) standard sample outside the work area plus required blanks. []Analysis by TEM.

1.9 SMALL ASBESTOS ABATEMENT PROJECT (LESS THAN 260 LINEAR FEET OR 160 SQUARE FEET, GREATER THAN 25 LINEAR FEET OR 10 SQUARE FEET)

A. Pre-abatement sampling; Three (3) samples inside and three (3) samples outside the work area plus required blanks. Analysis by PCM

B. During abatement; if required, during abatement air sampling shall be in compliance with New York State Department of Labor Applicable Variance and/or approved Specific Variance. Analysis by TEM. (Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.

C. Final clearance air samples;
1. Five (5) aggressive air samples inside and three (3) standard samples outside the work area plus required blanks. Analysis by PCM. Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
2. If one or both sets of samples do not meet the above stated final clearance air sample criteria, the contractor shall re-clean the work area and a complete duplicate set of final clearance air samples shall be collected by the Project Monitor/Air sample Technician. The contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.

1.10 LARGE ASBESTOS ABATEMENT PROJECT (260 LINEAR FEET OR 160 SQUARE FEET OR GREATER)

A. Pre-abatement sampling; Five (5) samples inside and five (5) samples outside the work area plus required blanks. Analysis by PCM

B. During abatement; Five (5) samples outside the work area plus required blanks. Analysis by PCM

C. Final clearance air samples;
1. Up to five (5) aggressive air samples inside and five (5) standard outside the work area plus required blanks. Analysis by TEM. Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
2. If one or both sets of samples do not meet the above stated final clearance air sample criteria, the contractor shall re-clean the work area and a complete duplicate set of final

clearance air samples shall be collected by the Project Monitor/Air sample Technician. The contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.

1.11 SCOPE OF WORK

A. The quantities listed in the tables are for informational purposes ONLY. The contractor shall be responsible for ALL asbestos containing materials within the work areas.

B. Work areas are as follows:
   1. Work Area #1 – Refer to drawing ES-AB1.1 and work description below:
      a. Removal of approximately 252 L.F. of PCB containing caulk / sealant around window systems.
   2. Work Area #2– Refer to drawings IJ-AB1.1, IJ-AB1.2, IJ-AB1.3, IJ-AB1.4, IJ-AB1.5, IJ-AB1.6, IJ-AB1.7, IJ-AB1.8 and work description below:
      a. Remoal of approximately 4,150 L.F. of PCB containing caulk / sealant around window systems.
   3. Work Area #3 – Refer to drawing IJ-AB1.2 and work description below:
      a. Removal of bleacher system from plaster wall, cleaning all dust and debris from bleacher system. Anchoring new wood blocking into plaster wall as required for new bleacher system to be installed.
   4. Work Area #4 – Refer to drawing IJ-AB1.3 and work description below:
      a. Removal of approximately 875 S.F. of asbestos containg floor tile, mastic, vinyl base, transition strips, and all flooring accessories.
   5. Work Area #5 – Refer to drawing IJ-AB1.5 and work description below:
      a. Removal of approximately 375 S.F. of asbestos containing floor tile, mastic, vinyl base, transition strips, and all flooring accessories.

C. The work shall be completed in one phase within the following schedule:
   1. Work Area #1 Completed in 4 working days.
   2. Work Area #2 Completed in 12 working days.
   3. Work Area #3 Completed in 4 working days.
   4. Work Area #4 Completed in 4 working days.
   5. Work Area #5 Completed in 4 working days.
   6. Work Area #6 Completed in 4 working days.

D. Dumpster locations and lift usage shall be subject to acceptance by the Architect/Certified Project Designer.

E. If final clearance air samples do not meet the criteria as regulated by New York State Department of Labor and the New York State Education Department, the contractor shall re-clean the work area and a complete, duplicate set of final clearance air samples, shall be collected by the Project Monitor/Air Sampling Technician. The Contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.

F. An asbestos demolition survey is available for review. The contractor shall be responsible for the abatement of all asbestos containing materials in preparation for demolition by others. If bulk sampling is required to determine a complete abatement the Owner shall perform all testing, and all sampling costs shall be the responsibility of the Contractor.

G. Only low odor mastic remover shall be approved for use. Mastic remover must be thoroughly cleaned from all areas of the building. Permeable materials (wood, drywall, carpets, plaster, etc.) must be protected from absorbing the mastic remover solvents. Mastic remover application and cleanup instructions must be strictly followed. A minimum of two soap and water washes must be provided on all surfaces where mastic remover was applied. The

asbestos abatement contractor shall be responsible to assure that the mastic remover is compatible with scheduled finishes to maintain all product system warranties.

H. Mastic shall be removed thoroughly to the point at which scraping mastic with a metal scraper will not produce build-up of mastic material on the scraper.

I. The abatement contractor shall disconnect and remove existing unit ventilators and unit ventilator metal shelving. The asbestos abatement contractor shall removal vinyl asbestos floor tile below unit ventilator and unit ventilator shelving. The abatement contractor shall reconnect existing unit ventilators and unit ventilator shelving to existing layout.

J. Any encapsulant, mastic remover or other product used, shall be compatible with the new finishes. It shall be the contractor's responsibility to coordinate the product being used with the new finish products. No encapsulant, mastic remover and/or other product shall be used that has not been approved.

K. Roof mechanical shut down, if needed, shall be coordinated with the Owner and/or the Owner's representative.

L. The contractor shall be responsible to employ removal methods, sufficient cleaning and/or other such means, methods or equipment to provide areas free of odors, fumes, and/or irritants or residues. The contractor shall respond and remove the cause of such odors, fumes or irritants at its own expense if notified by the Owner or Architect/Certified Project Designer, within six months of the date of substantial completion.

1.12 LICENSING AND CERTIFICATION

A. The contractor must have successfully completed a contractor supervisor course approved by the EPA.

B. The contractor must hold a valid State of New York, Department of Labor asbestos contractor's license. A copy of this asbestos license shall be conspicuously displayed proximate to but outside the work area during the duration of the project.

C. The contractor shall permit only those persons who hold valid State of New York Department of Labor asbestos handling certificates to engage in work on this project.

D. The Contractor shall have EPA Certification as an Asbestos Contractor.

PART 2 UTILITIES

2.1 WATER:

A. When feasible, interrupt the flow of water to areas where asbestos removal shall be conducted. This requirement shall be mandatory in areas of demolition.

B. The Owner shall furnish access to water required for construction, at no cost to the contractor. The contractor shall be responsible for any plumbing work or fixtures necessary to connect to the Owner's existing system, and shall be required to provide anti-siphon devices at the connection to the Owner's water system.

C. Contaminated water shall be treated by a several stage filter system consisting minimally of a 25 micron filter followed by a 5 micron filter and typically by a 5 micron, 50 micron and 100 micron filter series prior to disposal in a municipal sewage system. This process may only be used when not contrary to local ordinances.

D. Coordinate with the Owner for the nearest hookup and drainage. It shall be the contractor's responsibility to connect the water source to the location needed and to provide required drainage.

2.2 ELECTRICITY:

A. Electricity shall be from the Owner's designated panel box, through the contractor's power board, to the work area. The contractor shall supply the air-monitoring firm with sufficient outlets.

B. The contractor shall label any circuits disabled in conjunction with the work; "TEMPORARILY DISCONNECTED DUE TO RENOVATION WORK. DO NOT ACTIVATE THESE CIRCUITS – SAFETY HAZARD".

C. The contractor shall supply a power board on site designed to handle the expected electrical load during the project. The power board shall be installed, tested and activated prior to any other site work for the execution of this contract. This work shall be accomplished by a properly trained and experienced electrician.

D. Provide as required by 29 CFR 1926, temporary 120/240 Volt, single phase, three wire, 100 amp electric service with Ground Fault circuit Interrupters (GFCI) for electrical requirements for the project. No damaged electrical cords shall be allowed on site. Draw out power service from Owner's existing power panel to service the contractor's power board. Each HEPA unit shall be circuited to a separate and unique breaker with a minimum of 15 amp. service to prevent multiple loss of negative pressure units.

E. Provide temporary lighting with "weatherproof" fixtures for work areas including the decontamination chambers.

F. Provide electrical service as needed by the Project Monitor and the AST (including GFCI). Minimum electrical services that are to be provided include:
   1. Six 15 amp. protected 3 prong outlets within the work area.
   2. Six 15 amp protected 3 prong outlets for work areas outside of the containment zone or area.
      a. The Owner shall not be responsible for making available to the contractor temporary electrical service systems.
      b. The contractor shall supply power and connections to maintain fire alarms and security system in non-work areas. The contractor may also be required to provide temporary electrical service to occupied portions of the building.

PART 3 EXECUTION

3.1 WORK AREA PREPARATION

A. The work area shall be vacated by the occupants prior to work area preparation and until satisfactory clearance air monitoring results have been achieved.

B. Caution signs meeting the specifications of OSHA 29 CFR 1910.1001(j) shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.

C. Shut down and lock out electric power to all work areas. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to

work areas shall be brought in from outside the area through a ground-fault circuit interrupter at the source.

D. The personal decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.

E. Heating, Ventilating and Air Conditioning (HVAC) System Isolation. Acceptable methods for HVAC system isolation shall include conformance with NYCRR Title 12, Subpart 56-8.

F. Shutdown and isolation HVAC systems to prevent contamination and asbestos dispersal to other areas of the building or structure.

G. Contaminated HVAC filters shall be handled and disposed of as asbestos waste material. The ducts and filter assembly shall be wet cleaned and/or HEPA vacuumed where system air samples and/or dust samples indicate asbestos contamination.

H. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects and items shall be enclosed with two layers of at least six-mil plastic sheeting and sealed with tape.

I. The work area shall be cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be permitted.

J. Isolation barriers that seal off all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetrations of the work area shall be constructed using two layers of at least six mil, fire retardant plastic sheeting sealed with tape. Also, all seams in system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.

K. Separation of the work area from the remainder of the work site by construction of isolation barriers shall be accomplished as follows:
   1. Wall shall be constructed of wood or metal framing to support barriers in all openings larger than thirty-two square feet, except where any one dimension is one foot, or less.
   2. A sheathing material of at least three-eighths inch thickness shall be applied to the work side of the barrier.
   3. Edges of the partition shall be caulked at the floor, ceiling, walls and fixtures to form an airtight seal.
   4. The work area side of the partition shall be covered with a double layer of at least six-mil, fire retardant plastic sheathing with staggered joints and sealed.

L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

3.2 TRANSPORTATION AND DISPOSAL

A. Applicable Regulations:
   1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following regulations:
      a. NYS DEC 6 NYRCC part 360 and 364
      b. USEPA NESHAPS 40 CFR 61
      c. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

B. Transportation and Disposal Site:
   1. The Contractor’s hauler and disposal site shall be subject to the approval of the Project Monitor.

2. The Contractor shall give 24-hour notification prior to removing any waste from the site. Waste shall be removed from site only during normal working hours unless otherwise specified. No waste may be taken from the site without authorization from the Project Monitor.

C. Prior to the removal of any waste materials from the site, the contractor shall submit a complete and valid copy of an “Industrial Waste Transporter Permit” specifically for asbestos-containing materials, pursuant to 6 NYCRR 364 for the transporting of waste. Only vehicles listed on this permit shall be allowed to transport waste materials from the site.

D. Waste Shipment Record; Prior to the transport of any waste materials from the site, the contractor shall submit a Waste Shipment Record (WSR) to the Project Monitor with generator and transporter sections completely filled in and signed for each day on which asbestos waste is removed from the site. Provide originally signed WSR to Project Monitor so he can make copies for records and return the originally signed WSR to transporter so that original signature of landfill agent can be entered upon delivery to landfill. This documentation shall include the amount of waste removed, in both numbers of bags or containers, which correspond to the Project Monitor’s logged count and cubic yards. The WSR shall include the, name and address of the transporter, the landfill to which the waste is transported, the quantity accepted by the landfill and the signature of the landfill official who accepts the delivery. Waste Shipment Records bearing the original signature (carbon copy bearing impressions of the original signatures are acceptable) of the landfill agent receiving the waste mast be received by the Owner/Architect/Certified Project Designer within 35 days of shipment. Failure to comply shall result in a detailed report being transmitted to the New York State Department of Labor and EPA-NESHAPS.

END OF SECTION

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
HOMER ELEMENTARY SCHOOL

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Homer Elementary School
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Homer Elementary School in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Homer Elementary School in Homer, New York. This school consists of an original section constructed in 1925, with an addition constructed in 1950. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on June 28 – June 30, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 620 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 620 XRF samples collected throughout the school, approximately 8% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below by construction vintage. These components should be considered positive throughout each applicable construction vintage. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings.

Summary of Components Treated with Lead-Based Paint
1925 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Floor	Concrete	N/A	Silver, Green
Wall	Plaster	Wall (below chair-rail)	All Colors
Interior Stairs	Metal	Stringer & Baluster	Green
Door	Wood	Casing	Varnished
Exterior Door	Metal	N/A	Brown
Exterior Window	Metal	Casing (original)	White

Summary of Components Treated with Lead-Based Paint
1950 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Floor	Concrete	N/A	Red, Green
Wall	Metal	Baseboard	Black
Wall	Brick	N/A	Yellow, Green
Exterior Stairs	Metal	Baluster	Brown
Exterior Window	Metal	Casing (original)	White

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows; 5=1925, 0=1950. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Classroom 220	1925	<7.50	50
FLOOR-2	Classroom 218	1925	<7.50	50
FLOOR-3	Classroom 305	1925	<7.50	50
FLOOR-4	Classroom 303	1925	<7.50	50
WIN-1	Classroom 220	1925	<7.50	400
WIN-2	Classroom 218	1925	<7.50	400
WIN-3	Classroom 305	1925	9.38	400
WIN-4	Classroom 303	1925	12.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
HOMER SENIOR HIGH SCHOOL

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Senior High School
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Senior High School in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Senior High School in Homer, New York. This school consists of an original section constructed in 1949, with an addition constructed in 1960. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on July 5 – July 7, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 750 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 750 XRF samples collected throughout the school, approximately 3% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below by construction vintage. These components should be considered positive throughout each applicable construction vintage. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings. No components sampled in the 1960 construction vintage were determined to be treated with lead-based paint.

Summary of Components Treated with Lead-Based Paint
1949 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Structural Support	Metal	I Beam	Yellow, White
Wall	Brick	N/A	All Colors
Interior Stairs	Metal	Stringer & Baluster	Green
Exterior Window	Metal	Casing (original)	Yellow

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows;

9=1949, 0=1960. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Weight Room	1949	<7.50	50
FLOOR-2	Classroom 49	1960	<7.50	50
FLOOR-3	Bathroom	1949	<7.50	50
FLOOR-4	Classroom 218	1949	<7.50	50
WIN-1	Weight Room	1949	<7.50	400
WIN-2	Classroom 49	1960	<7.50	400
WIN-3	Classroom 105	1949	<7.50	400
WIN-4	Classroom 218	1949	<7.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
HOMER INTERMEDIATE/JUNIOR HIGH SCHOOL

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Intermediate/Junior High School
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Intermediate/Junior High School in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Intermediate/Junior High School in Homer, New York. This school consists of an original section constructed in 1966, with an addition constructed in 1974. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on July 17 – July 19, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 730 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 730 XRF samples collected throughout the school, < 1% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below by construction vintage. These components should be considered positive throughout each applicable construction vintage. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings.

Summary of Components Treated with Lead-Based Paint
1974 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Stairs	Metal	Railing	Green
Door	Wood	N/A	Green

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows; 6=1966, 4=1974. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Classroom 160	1974	<7.50	50
FLOOR-2	Classroom 103	1966	<7.50	50
FLOOR-3	Classroom 258	1974	<7.50	50
FLOOR-4	Classroom 212	1966	<7.50	50
WIN-1	Classroom 160	1974	<7.50	400
WIN-2	Classroom 103	1966	<7.50	400
WIN-3	Classroom 258	1974	<7.50	400
WIN-4	Classroom 212	1966	<7.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

FINAL REPORT
HOMER CENTRAL SCHOOL DISTRICT
LEAD-BASED PAINT SURVEY
BUS GARAGE AND MUSIC ANNEX

ENSR®

PREPARED BY:
ENSR CONSULTING
PROJECT NO. 991003
JULY 31, 2000

ENSR

Celebrating 30 Years of Excellence in Environmental Services

6601 Kirkville Road
East Syracuse, NY 13057
(800) 950-0506
(315) 432-0506
FAX (315) 437-0509
http://www.ensr.com

July 31, 2000

Mr. Harold E. Ferguson
Superintendent
Homer Central School District
P.O. Box 500
Homer, New York 13077

Re: Lead-Based Paint Survey
Bus Garage and Music Annex
Final Report
ENSR Project No. 991003

Dear Mr. Ferguson:

This report documents the lead-based paint survey and lead hazard screen conducted at the Bus Garage and Music Annex in the Homer Central School District.

Background

ENSR Consulting (ENSR) was retained by the Homer Central School District to conduct a lead-based paint survey and lead hazard screen at the Bus Garage and Music Annex in Homer, New York. This facility was constructed in 1950. The entire building and exterior was surveyed in accordance with the New York State Department of Education Regulations of the Commissioner of Education- Part 155.5 (8 NYCRR 155.5) as amended on October 7, 1999. This regulation was enacted to protect building occupants from exposure to lead-based paint. It requires school districts to survey painted surfaces that may be impacted by a renovation, maintenance activity or where paint is peeling or flaking. These surveys are to be conducted in accordance with the federal Housing and Urban Development (HUD) guidelines (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing- June 1995). This regulation also requires compliance with HUD Guidelines regarding lead-based paint encapsulation, abatement, clearance sampling, and associated worker certifications.

Survey Methods

The survey was conducted on July 10, 2000 by Tim Coughlin of ENSR. ENSR is accredited by the Environmental Protection Agency to conduct lead-based paint activities, a copy of our firm's license is provided in Appendix A. Mr. Coughlin has completed EPA approved lead-based paint training for inspectors and risk assessors. Copies of his training certifications are enclosed in Appendix B.

The survey was initiated by first identifying building components, room equivalents, construction vintages of the school building and any additions. Building components are groups of painted building materials that can be combined, for sampling purposes, and are of the same type, substrate, construction vintage, and color. Examples include: brown wood door frames, white plaster walls, white sheetrock walls, etc. Room equivalents are spaces that have the same use, construction vintage, paint history, and building components which can be grouped together for testing purposes. Examples would include similar classrooms, similar bathroom areas, etc.

HUD Guidelines require at least one sample of each building component in each room equivalent to be tested for the presence of lead-based paint.

Paint sampling during this survey was conducted utilizing a Niton XL-309 X-ray florescence analyzer (XRF). This instrument will provide a direct reading identifying a lead concentration. The instrument is calibrated in the field at the beginning, middle and end of each work shift to ensure accuracy. The HUD action level for considering paint to be lead-containing is 0.5 % lead by weight or 1.0 milligrams per square centimeter (mg/cm^2). ENSR collected approximately 130 XRF readings of painted components during the survey. Based on the XRF results, paint condition and potential exposure to building occupants, ENSR collected 8 dust/wipe samples as a lead hazard screen. All sample locations and results (positive or negative) are reflected on the drawings provided in Appendix C.

Dust/wipe samples were analyzed by AMA Analytical Services (AMA) of Lanham, Maryland. AMA is recognized under the EPA National Lead Laboratory Accreditation Program (NLLAP) as required by HUD Guidelines. Dust/wipe samples were analyzed using Graphite Furnace Atomic Absorption Analysis and all results were reported in micrograms per square foot. Laboratory analytical reports and sample chain-of-custody sheets are included in Appendix D.

Results

Of the estimated 130 XRF samples collected throughout the school, approximately < 1% were positive for lead-based paint under the HUD Guidelines. HUD classifies components as positive or negative based on the percentage of positive sample results per component. The positive components found during this survey are summarized below. These components should be considered positive throughout the building. Components sampled and determined to be positive in isolated instances only are not considered positive throughout the building, but only at the sampled location. These components are represented on the drawings.

Summary of Components Treated with Lead-Based Paint
1950 Construction Vintage

Building Component	Component Substrate	Component Identifier	Component Color
Structural Support	Metal	I Beam	Blue

In Table 1, following this report, each sample collected has been classified as positive or negative based on HUD criteria. The information presented in Table 1 is downloaded from the XRF instrument and provides the following data; sample number, floor level, room or sample location, structural component sampled, substrate, component feature (ie. door jamb), paint condition, paint color, notes or comments, sample result (+ or -), and the actual lead content. The note/comment field in Table 1 represents the construction vintage of the building as follows; 0=1950. The sample number from Table 1 correlates with the sample numbers on the drawings in Appendix C.

Lead hazard screens and risk assessments focus on areas with deteriorated lead-based paint. This facility has very little lead paint and the majority was observed to be intact. Sample results have been compared to the HUD established guidelines for lead hazard screen dust/wipe sampling in

Table 2 below and sample locations are depicted on the drawings in Appendix C. All wipe samples were well below the HUD guidelines.

Table 2
Lead Hazard Screen
Dust/Wipe Sample Results

Sample Number	Sample Location	Construction Vintage	Analytical Result (ug/ft^2)	HUD Guideline (ug/ft^2)
FLOOR-1	Music Room	1950	<7.50	50
FLOOR-2	Music Room	1950	<7.50	50
FLOOR-3	Music Room	1950	<7.50	50
FLOOR-4	Office	1950	<7.50	50
WIN-1	Music Room	1950	<7.50	400
WIN-2	Music Room	1950	<7.50	400
WIN-3	Music Room	1950	<7.50	400
WIN-4	Office	1950	<7.50	400

In accordance with HUD, any construction or maintenance activities which will disturb lead-based paint will require mitigation of those areas pursuant with HUD Guidelines.

It has been a pleasure working with you on this project. If you have any questions regarding this report please call this office at (315) 432-0506.

Sincerely,

ENSR Consulting

Mark A. Fiorini
Project Manager

Attachments: Table 1 : XRF Sample Data
Appendix A: Firm License to Conduct Lead-Based Paint Activities
Appendix B: Personnel Certifications
Appendix C: Survey Drawings
Appendix D: Laboratory Reports and Sample Chain-of-Custody Sheets

SECTION 02 41 00
SELECTIVE STRUCTURAL DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

B. Demolishing designated building equipment and fixtures.

C. Demolishing designated construction.

D. Removing designated items for Owner retention.

E. Protecting items designated to remain.

F. Removing demolished materials.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 35 17 - Alteration Project Procedures: Protection of existing facilities; cutting and patching requirements.

C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

E. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

F. Section 31 10 00 - Site Clearing: Vegetation and existing debris removal.

G. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

H. Section 31 23 23 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Areas for temporary construction and field offices.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Indicate location of items designated for Owner retention.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of ten years of documented experience.

B. Design shoring, bracing, underpinning under direct supervision of Professional Engineer experienced in design of this Work and licensed the State of New York.

C. Conform to applicable code for demolition work, safety of adjacent structures, dust control, products requiring electrical disconnection and re-connection.

D. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.

E. Obtain required permits from authorities having jurisdiction.

1.5 SEQUENCING

A. Section 01 10 00 - Summary: Requirements for sequencing.

B. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.7 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Schedule work to coincide with new construction.

C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owner operations.

D. Performance of noisy, malodorous, dusty, and removal of hazardous material work:
   1. Will not be permitted during school hours.
   2. All activities must be coordinated with the Owner to ensure that programming and services will be uninterrupted by construction activities and to ensure the safety of the students and occupants.

E. Coordinate utility and building service interruptions with Owner.
   1. Do not disable or disrupt building fire or life safety systems without five days prior written notice to Owner.
   2. Schedule tie-ins to existing systems to minimize disruption.
   3. Coordinate work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.8 PROJECT CONDITIONS

A. Buildings indicated to be demolished will be vacated before start of Work.

B. Owner assumes no responsibility for actual condition of buildings to be demolished.

C. Hazardous Materials: Known hazardous materials will be removed before start of Work. Notify Architect/Engineer upon discovery of a hazardous material.

D. Each contractor shall be responsible for the cutting and patching of existing surfaces as required to complete the work of their contract unless noted otherwise.

E. Conduct demolition to minimize interference with adjacent and occupied building areas.

F. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.1 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Coordinate demolition sequence and procedures to prevent structures from becoming unstable.
   3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   4. Layout cuts in post-tensioned concrete elements to avoid cutting concrete within 12 inches of any stressing tendon. Notify Architect five days in advance of cutting post-tensioned concrete.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks or hydrants without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

E. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. Verify hazardous material abatement is complete before beginning demolition.

H. Carefully remove building components indicated to be reused.

1. Mark components and packaged parts to permit reinstallation.
2. Store components, protected from construction operations until reinstalled.

I. At completion of the demolition work restore, repair or refinish all building systems, components and finishes disturbed as the result of the demolition process.

J. Remove foundation walls and footings to minimum of two feet below finished grade .

3.2 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.3 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
1. Verify that construction and utility arrangements are as indicated.
2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
1. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
1. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.

4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

3.4 SALVAGE REQUIREMENTS

A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.

B. Tag components and equipment Owner designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.5 DEBRIS AND WASTE REMOVAL

A. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 02 83 13
LEAD HAZARD CONTROL ACTIVITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Summary of labor, materials, services, and equipment necessary for complete removal and disposal of the following demolition debris in accordance with U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the State of New York, and local regulations:
   1. Lead-based paint.
   2. Lead-containing material.

1.2 DEFINITIONS

A. Lead-based paint (LBP), as defined by the United States Environmental Protection Agency (USEPA) and the United States Department of Housing and Urban Development (HUD), means paint or other surface coatings that contain lead equal to or greater than 1.0 milligram per square centimeter (mg/cm2) or 0.5% by weight; or 5000 parts per million (ppm) by weight.

B. Lead, as defined by Occupational Safety & Health Administration (OSHA) 29 CFR 1926.62, means metallic lead, all inorganic lead compounds, and organic lead soaps. All other organic lead compounds are excluded from this definition.

C. Action Level, as defined by OSHA 29 CFR 1926.62, means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter (30 µg/m3) of air calculated as an 8-hour time-weighted average (TWA).

D. Permissible Exposure Limit (PEL), as defined by OSHA 29 CFR 1926.62, means employee exposure, without regard to personal protective equipment, to an airborne concentration of lead of 50 µg/m3 (calculated as a TWA).

E. Competent person, as defined by 29 CFR 1926.62, means one who is capable of identifying lead hazards and implementing corrective measures to eliminate hazards.

F. Lead-containing material (LCM) includes LBP, lead-containing components / surfaces, and ceramic tile / ceramic block applications. A building material is defined as an LCM if any detectable amount of lead is present in that building material.

1.3 REFERENCE STANDARDS

A. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.

B. 29 CFR 1910.134 - Respiratory protection; current edition.

C. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

D. 29 CFR 1926.62 - Lead; current edition.

E. 40 CFR - U.S. Code of Federal Regulations; Title 40 - Protection of Environment; current edition.

F. NYSDEC Regulations - 6 NYCRR, Chapter IV, current edition.

1.4 SUMMARY OF WORK

A. All painted surfaces / building materials are presumed to contain lead and shall be treated as LCM on this project. Upon request, the Contractor may review available survey reports for additional details pertaining to LCM (including LBP) identified at the project site.

B. Activities that will disturb LCM shall comply with the conditions specified herein. The OSHA regulates occupational exposure to lead under 29 CFR 1926.62, Lead in Construction Standard. Any Contractor disturbing LCM shall comply with all the requirements of 29 CFR 1926.62 and this specification. The intent is for the Contractor to protect their workers and building occupants from unnecessary exposures to lead.

C. The Contractor shall provide all labor, materials, tools, and equipment necessary to protect both workers and building occupants from potential lead exposure.

D. Any waste products shall be considered industrial or hazardous waste, based on the results of a Toxicity Characteristic Leaching Procedure (TCLP) test. The cost of this testing shall be the sole responsibility of the Contractor and included in their bid for the project.

E. Exact quantities and locations of LCMs that will be disturbed shall be determined by the Contractor at the time of bid. The Contractor must be satisfied as to the quantity of wastes requiring transport & disposal, and include all such costs in their bid price.

F. All work shall be performed in accordance with this specification and applicable federal, state, and/or local regulations. Dry sweeping of lead-containing dust is prohibited. Lead-containing debris shall be removed and collected using high efficiency particulate air (HEPA) vacuums designed to collect waste including paint chips, debris, and dust.

G. It is the Contractor's responsibility to ensure that waste materials are contained, transported, and disposed of in accordance with all applicable federal, state, and local regulations.

1.5 APPLICABLE REGULATIONS

A. The Contractor shall comply with all federal, state, and local laws, ordinances, rules, and regulations regarding the handling, storage, and disposal of LCM. The Contractor is further responsible to conduct work in compliance with all applicable codes, rules, laws, and regulations including, but not limited to:
   1. Worker Protection - Occupational Safety and Health Administration (OSHA)
      a. 29 CFR 1910.134 - Respiratory Protection Standard
      b. 29 CFR 1926 Subpart C - General Safety and Health Provisions
      c. 29 CFR 1926.59 - Hazard Communication
      d. 29 CFR 1926.62 - Lead Exposure in Construction
      e. 29 CFR 1910.94 and 29 CFR 1926. 57 – Ventilation
   2. Ambient Air Quality - Environmental Protection Agency (EPA)
      a. 40 CFR Part 50.6 - National Primary and Secondary Ambient Air Quality Standards for Particulate Matter
   3. Water Quality - Environmental Protection Agency (EPA)
      a. 40 CFR Part 122 - Administered Permit Programs; The National Pollutant Discharge Elimination System
   4. Waste Disposal - Environmental Protection Agency (EPA)
      a. 40 CFR Part 261 - Identification and Listing of Hazardous Waste
      b. 40 CFR Part 262 - Standards Applicable to Generators of Hazardous Waste
      c. 40 CFR Part 263 - Standards Applicable to Transporters of Hazardous Waste
   5. New York State Department of Environmental Conservation (NYSDEC)
      a. 6 NYCRR; Chapter IV; Parts 360.7, 364, and 370 through 374

B. The Contractor shall comply with the following regulatory agencies and guidance documents:
   1. U.S. Department of Labor.

2. Occupational Safety and Health Administration Pub. 3126 - Working with Lead in the Construction Industry.
3. USEPA Lead Renovation, Repair and Painting (RRP) Program.

1.6 LEAD HAZARDS

A. Work practices / methods that may release lead dust or fumes into the air and onto surrounding surfaces are prohibited. It is the Contractor's responsibility to reduce potential exposure to lead.

B. Lead is a toxic substance, which travels into the body by inhalation or ingestion due to lead dust and/or fumes that are present. Upon entering the body, lead enters the bloodstream, traveling throughout the body. The body cannot eliminate all of the lead; therefore, it is stored in tissue and organs. Stored quantities of lead may cause irreversible damage to cells, organs, and body systems.

C. Exposure to lead may affect individuals differently. Exposure may occur without any indication of exposure or symptoms developing. Symptoms of lead poisoning to be aware of include, but are not limited to, loss of appetite, trouble sleeping, irritability, fatigue, headache, joint and muscle ache, metallic taste, decreased sex drive, lack of concentration, and moodiness.

D. Prolonged exposure may result in damage to the body's systems including nervous, reproductive and circulatory systems. Symptoms of such exposures may include, but are not limited to, stomach pains, high blood pressure, nausea, tremors, seizures, anemia, constipation, and convulsions.

E. The Contractor's Supervisor is responsible to monitor any workers for such symptoms and is further responsible for ensuring affected workers are removed from the area. Affected workers shall not return until such time that the requirements outlined in the OSHA Lead in Construction Standard (29 CFR 1926.62) have been met.

1.7 GENERAL REQUIREMENTS

A. The Contractor is responsible for complying with the following general requirements applicable to the project (at a minimum):
1. Respiratory Protection and personal protection.
2. Medical examinations.
3. Utilization of engineering controls, as necessary, to reduce potential exposure.
4. Proper clean up and disposal of all lead-related waste materials, as required.

B. The Contractor is solely responsible for properly protecting their workers. Additional safety measures beyond OSHA requirements are encouraged, but are at the implementation and discretion of the Contractor.

1.8 SUBMITTALS

A. Pre-Abatement Submittals. The Contractor shall submit the following information to the Project Architect and Project Designer at least ten (10) business days prior to starting the work:
1. Work Plan - The Contractor shall submit a work plan in compliance with the requirements of the OSHA Lead in Construction Standard (29 CFR 1926.62). The plan shall include but is not limited to: handling, cleaning, containerizing, transport, and disposal.
2. Equipment - Information for all equipment utilized shall be submitted for review prior to commencement of project activities. This includes, but is not limited to: equipment specifications and safety data sheets (SDS).
3. Training - The Contractor shall provide proof of Lead Awareness Training in accordance with OSHA 29 CFR 1926.62 for all employees performing renovation / repair activities resulting in the disturbance of LCMs.

4. Disposal - The Contractor shall submit documentation including all required permits, anticipated disposal facilities, and anticipated transporter information should construction waste be determined to be hazardous. If applicable, copies of applicable laboratory credentials shall be provided for the laboratory performing TCLP analysis.

B. Post-Abatement / Closeout Submittals. The following information shall be transmitted to the Project Architect and Project Designer within thirty (30) business days following completion of all renovation activities:
1. Copies of all OSHA personal / employee lead exposure assessment air sampling data collected during the course of the renovation project.
2. Copies of waste manifests / disposal documentation associated with any LCM waste removed from the project.
3. Any other documentation requested by the Owner or Owner's Representatives.

1.9 PERSONAL AIR SAMPLING & ANALYSIS

A. The Contractor is responsible for conducting personal lead exposure assessment air monitoring of their employees, as required by OSHA 29 CFR 1926.62. Personal air samples shall be collected which are representative of a full-shift including at least one sample for each job classification in each work area either for each shift or for the shift with the highest exposure level. Full-shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

B. If requested by the Building Owner or Consultant, the Contractor shall provide laboratory analysis reports showing that they are conducting personal lead exposure assessment air monitoring of employees working with lead in accordance with OSHA 29 CFR 1926.62.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Solutions – The Contractor shall utilize a lead-specific cleaning solution for all cleaning activities. The cleaning solution shall be an approved solution that does not contain tri-sodium phosphate (TSP).

B. Plastic Sheeting - To prevent dust migration during renovation / demolition activities, the Contractor shall utilize dust barriers, containments, and/or enclosures constructed of 6-mil fire-retardant plastic sheeting. These barriers shall be constructed to minimize dust migration into adjacent non-work areas.

C. Framing - If framing is utilized for the construction of dust barriers / containments, the Contractor shall utilize reinforcement framing / sheathing materials that are at least ?-inch thick. Minimum requirements for framing materials shall be comprised of 2"x4" stud framing in accordance with all applicable building and fire codes.

D. Adhesives – The Contractor shall utilize commercially available duct tape and spray adhesives designed for such purposes to maintain the integrity of barriers, containments, and enclosures.

2.2 EQUIPMENT

A. Protective Clothing – Contractor shall provide their employees with coveralls, gloves, eye protection, ear protection, safety footwear, hard hats, fall protection etc. as required per applicable OSHA regulations.

B. Respiratory Protection - The Contractor shall provide their workers with adequate respiratory protection based upon the lead hazards present during each respective work task being

performed. The level of respiratory protection shall be determined through personal exposure assessment air monitoring.

C. Respirator Filters - The Contractor shall provide their workers with appropriate respirator filters for the respiratory protection the workers are utilizing as per OSHA 29 CFR 1910.134.

PART 3 - EXECUTION

3.1 LEAD COMPLIANCE PLAN

A. The Contractor is required to establish and follow a lead compliance plan for the entire renovation project. The requirements, as outlined in OSHA 29 CFR 1926.62, include written procedures for construction activities with regard to control methods and engineering controls.

B. If the Contractor fails to follow their lead compliance plan, the Owner reserves the right to hire a third-party Environmental Consultant to oversee the Contractor's work. The cost for the third-party Environmental Consultant shall be borne by the Contractor.

3.2 SIGNAGE

A. Warning signs shall be posted where the potential for any lead exposure exists.

B. Signs shall remain in place until renovation / demolition activities have been completed and the renovation area has been satisfactorily cleaned.

C. All signage shall comply with OSHA 29 CFR 1926.62.

3.3 WORK METHODS

A. The Contractor shall select work methods in compliance with OSHA 29 CFR 1926.62. All work shall be performed utilizing wet methods and other engineering controls, as necessary.

B. The Contractor is prohibited from dry methods of removal, heat gun applications, mechanical methods (grinding/sanding), and/or torch-cutting during renovation / demolition activities.

3.4 CLEANING & CLEARANCE

A. Following the completion of all lead-related work activities, all surfaces within and 25 feet beyond the areas impacted by the renovation work shall be cleaned of all visible paint chips, dust, and debris.

B. Visual examinations / inspections of all areas affected by the lead-related work shall be conducted by the Contractor's Supervisor to determine satisfactory cleaning of all affected areas; however, the Owner reserves the right to retain a third-party consultant to perform visual clearance inspections and/or perform lead dust wipe sampling to determine satisfactory cleaning and satisfactory completion of the work.

C. If the Contractor does not satisfactorily clean an area based on visual examinations or if lead dust-wipe sampling results are unacceptable, the affected areas shall be re-cleaned by the Contractor at their own expense. The cost for re-cleaning, third-party consultant oversight, and additional sampling/testing associated with re-cleaning activities shall be borne by the Contractor.

3.5 WASTE TRANSPORTATION & DISPOSAL ACTIVITIES

A. The Contractor is responsible for proper waste characterization sampling and laboratory analysis of LCM, prior to any waste transportation and disposal activities. Waste materials

include, but are not limited to, the following: personal protective equipment, plastic sheeting, signage, barrier tape, cleaning materials, LBP components, and associated building materials classified as LCM.

B. The Contractor is responsible to coordinate interim storage of waste containers at the site with the Owner and Owner's Representatives while awaiting waste characterization laboratory results.

C. Lead paint chips and lead paint debris shall not be co-mingled with construction and demolition (C+D) debris. Failure to do so may result in the Contractor having to pay the associated fees for co-mingled lead waste disposal at no additional cost to the Owner.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete formwork.

B. Floors and slabs on grade.

C. Concrete foundation walls.

D. Concrete reinforcement.

E. Joint devices associated with concrete work.

F. Miscellaneous concrete elements, including equipment pads.

G. Concrete finishing.

H. Concrete curing.

1.2 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

B. Section 32 13 13 - Concrete Paving: Sidewalks, curbs and gutters.

1.3 REFERENCE STANDARDS

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; 2016.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting; 2010.

G. ACI 306R - Guide to Cold Weather Concreting; 2016.

H. ACI 308R - Guide to External Curing of Concrete; 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete; 2019, with Errata (2021).

J. ACI 347R - Guide to Formwork for Concrete; 2014, with Errata (2017).

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.

M. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.

O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2019a.

P. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.

Q. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

R. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.

S. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.

T. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

U. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

V. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.

W. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.

X. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2017.

Y. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.

Z. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

AA. ASTM C 1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete, 2008.

AB. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015.

AC. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.

AD. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.

AE. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 2014.

AF. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric); 2014.

AG. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.

AH. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products such as joint devices, attachment accessories, and admixtures, showing compliance with specified requirements.
   1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

D. Design Data:
   1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
      a. Hot and cold weather concrete work.
      b. Air entrained concrete work.
   2. Identify mix ingredients and proportions, including admixtures.
   3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
   4. Submit concrete strength test data for each mix design per ACI 301 requirements.

E. Samples: Submit samples of underslab vapor retarder to be used.

F. Reinforcing Placement Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices, supporting & spacing devices. Indicate quantities of reinforcing steel and welded wire fabric.

G. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

H. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

I. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.

J. Test Reports: Submit report for each test or series of tests specified.

K. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution & Closeout Requirements.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.6 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

1.7 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Steel.
   2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
   3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
   1. Form: Flat Sheets.
   2. WWR Style: As indicated on drawings.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

D. Fiber Reinforcement: Alkali-resistant polypropylene monofilament complying with ASTM C1116/C1116M, 24 ksi minimum tensile strength. Mixing rate per manufacturer's recommendations.
   1. Fiber Length: 0.75 inch, nominal.
   2. Products:
      a. Fibermesh 150 by Propex Concrete Systems: www.fibermesh.com
      b. FRC Mono 150 by FRC Industries: www.frcindustries.com
      c. ECONO-MONO by Forta Corporation: www.forta-ferro.com
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.
   2. Coarse Aggregate Maximum Size: In accordance with ACI 318

C. Fly Ash: ASTM C 618, Class F. Loss on ignition requirement waived if used in flowable fill concrete mix.

D. Water: ACI 318; Clean and not detrimental to concrete.

2.4 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
   1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   2. Products:
      a. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com/#sle.
      b. Poly-America; Husky Yellow Guard 15-mil Vapor Barrier: www.yellowguard.com/#sle.
      c. Stego Industries, LLC; Stego Wrap 15-mil: www.stegoindustries.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.
   2. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.
   3. Flowable Products:
      a. Euclid Chemical Company; NS GROUT: www.euclidchemical.com/#sle.
      b. Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarproducts.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
   1. Minimum Compressive Strength at 7 days, ASTM D695: 12,000 pounds per square inch.

2.6 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

B. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.

2. Products:
   a. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
   b. Kaufman Products Inc; SurePoxy HM Class B: www.kaufmanproducts.net/#sle.
   c. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000, or SpecPoxy 3000FS: www.specchemllc.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, Nonextruding, resilient asphalt impregnated fiberboard or felt.

D. Expansion and Contraction Joint Devices: ASTM B221alloy, extruded aluminum; resilient elastomeric filler strip with Shore A hardness of 35 to permit plus or minus 25 percent joint movement with full recovery; extruded aluminum cover plate, of longest manufactured length at each location, flush mounted; color as selected.

2.7 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

B. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.

C. Moisture-Retaining Sheet: ASTM C171.
   1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
   2. Non-staining cotton fabric, weighing not less than 8 oz/per square yd, bonded to prevent separation during handling and placing.

D. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.

E. Water: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.

2.9 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
   1. Fiber Reinforcement: Batch and mix as recommended by manufacturer for specific project conditions.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Remove debris and ice from formwork, reinforcement, and concrete substrates.

C. Remove water from areas receiving concrete before concrete is placed.

D. Verify that forms are clean and free of rust before applying release agent.

E. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

F. Wet sticking anchor rods shall not be permitted.

G. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions. Remove laitance, coatings & unsound materials.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

H. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

I. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.
   2. Lap Vapor Barrier over footings and seal to foundation walls.
   3. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
   4. Seal all penetrations (including pipes) with pipe boot and tape.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.4 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify testing laboratory and Architect/Engineer not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.5 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

E. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

F. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

G. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

H. Install joint device anchors for expansion joint assemblies specified in Section 07 95 13. Maintain correct position to allow joint cover to be flush with floor and wall finish.

I. Install joint covers in longest practical length, when adjacent construction activity is complete.

J. Apply sealants in joint devices in accordance with Section 07 92 00.

K. Deposit concrete at final position. Prevent segregation of mix.

L. Place concrete in continuous operation for each panel or section determined by predetermined joints.

M. Consolidate concrete.

N. Place concrete continuously between predetermined expansion, control, and construction joints.

O. Do not interrupt successive placement; do not permit cold joints to occur.

P. Place floor slabs in checkerboard or saw cut pattern indicated.

Q. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.

R. Screed floors level, maintaining the following minimum F(F) Floor Flatness and F(L) Floor Levelness values when measured in accordance with ASTM E 1155/ASTM E 1155M.

3.6 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing, and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Place concrete floor toppings to required lines and levels.
1. Place topping in checkerboard panels not to exceed 20 feet in either direction.

E. Screed toppings level, maintaining surface flatness of maximum 1/8 inch in 10 feet.

3.7 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for compliance with specified tolerances.

B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
1. Exposed to View and Foot Traffic: F(F) of 35; F(L) of 25, on-grade only.
2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.

D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value.

E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.8 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.

D. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/4 inch per foot nominal if not indicated on the drawings.

3.9 CURING

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   3. Final Curing: Begin after initial curing but before surface is dry.

3.10 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed by Owner’s testing laboratory in accordance with ACI 318 and applicable code.

C. Provide free access to concrete operations at project site and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

E. Concrete Inspections:
   1. Continuous Placement Inspection: Inspect for proper installation procedures.
   2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures

F. Strength Test Samples:
   1. Sampling Procedures: ASTM C172
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured.
   3. Sample concrete and make one set of four cylinders for every 50 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
   4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
   5. Make one additional cylinder during cold weather concreting, and field cure.

G. Field Testing:
   1. Slump Test Method: ASTM C143/C143M.
   2. Air Content Test Method: ASTM C173/C173M.
   3. Temperature Test Method: ASTM C1064/C1064M.
   4. Measure slump and temperature for each compressive strength concrete sample.
   5. Measure air content in air entrained concrete for each compressive strength concrete sample.

H. Cylinder Compressive Strength Testing:
   1. Test Method: ASTM C39.
   2. Test Acceptance: In accordance with ACI 318 and applicable code.
   3. Test one cylinder at 7 days.
   4. Test two cylinders at 28 days.
   5. Retain one cylinder for 56 days for testing when requested by Architect/Engineer.
   6. Dispose remaining cylinders when testing is not required.

I. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.11 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections as directed by Architect/Engineer in accordance with ACI 318.

3.12 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect/ Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/ Engineer for each individual area.

3.13 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 03 45 00
PRECAST ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Architectural precast concrete wall panels.

B. Supports, anchors, and attachments.

C. Grouting under panels.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Admixtures.

B. Section 07 21 00 - Thermal Insulation: Integral insulation.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Reglets recessed in units.

1.3 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2016.

B. ACI 318 - Building Code Requirements for Structural Concrete; 2019, with Errata (2021).

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).

G. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.

H. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).

I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.

J. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

K. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2016.

L. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2017.

M. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.

N. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2019.

O. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

P. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

Q. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.

R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

S. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2017a.

T. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

U. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2013.

V. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; 2017.

W. PCI MNL-122 - Architectural Precast Concrete; 2007.

X. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.

Y. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.

C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, integral insulation, insulated panel system connectors, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials. Provide erection drawings.

1.5 QUALITY ASSURANCE

A. Design Engineer Qualifications: Design precast concrete units under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State of New York.

B. Fabricator Qualifications:
1. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete.

C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.6 MOCK-UP

A. Provide Below Window Bay Installation mock-up, 3'- 6"+/- feet tall by 8'-0" +/- feet wide, with lifting device, and attachment points, and finish in accordance with approved sample.

B. Include mock-up panel with typical window.

C. Locate where directed.

D. Mock-up may remain as part of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handling: Lift and support precast units only from support points.

B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.

C. Protect units to prevent staining, chipping, or spalling of concrete.

D. Mark units with date of production in location that will be concealed after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Architectural Precast Concrete:
1. Any manufacturer holding a PCI Group A Plant Certification for the types of products specified; see www.pci.org/#sle.

2.2 PRECAST UNITS, GENERAL

A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
1. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
2. Calculate structural properties of units in accordance with ACI 318.
3. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
4. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.

2.3 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi).
1. Deformed billet-steel bars.
2. Unfinished.

B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
1. Form: Flat Sheets.

2.4 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Fine and Coarse Structural Aggregates: ASTM C33/C33M.

C. Surface Finish Aggregate: Complying with sample in office of Architect.

D. Fiber Reinforcement: Synthetic fiber shown to be resistant to long-term deterioration when exposed to moisture and alkalis; 1/2 inch length.

E. Air Entrainment Admixture: ASTM C260/C260M.

F. Grout:
1. Non-shrink, non-metallic, minimum 10,000 psi, 28 day strength.

2.5 SUPPORT DEVICES

A. Connecting and Support Devices; Anchors and Inserts: ASTM A36/A36M steel; hot-dip galvanized in accordance with ASTM A153/A153M.
   1. Clean surfaces of rust, scale, grease, and foreign matter.

B. Bolts, Nuts, and Washers: ASTM A307 heavy hex bolts, Type A, hot-dip galvanized, with matching ASTM A563 (ASTM A563M) nuts and matching washers.

2.6 FABRICATION

A. Fabricate in compliance with PCI MNL-117 and PCI MNL-135.

B. Maintain plant records and quality control program during production of precast units. Make records available upon request.

C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.

D. Use form liners in accordance with manufacturer's instructions.

E. Maintain consistent quality during manufacture.

F. Fabricate connecting devices, plates, angles, items fit to steel framing members, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.

G. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.

H. Locate hoisting devices to permit removal after erection.

I. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

2.7 FINISH - SUPPORT DEVICES

A. Clean surfaces of rust, scale, grease, and foreign matter.

2.8 FABRICATION TOLERANCES

A. Comply with PCI MNL-117 and PCI MNL-135, except as specifically amended below.
   1. Maximum Variation From Nominal Face Dimensions: Plus or minus 3/32 in.
   2. Maximum Variation From Square or Designated Skew: Plus or minus 1/8 inch in 10 feet.
   3. Maximum Variation from Thickness: Plus or minus 1/8 in.
   4. Maximum Misalignment of Anchors, Inserts, Openings: Plus or minus 1/8 inch.
   5. Maximum Bowing of Members: Plus or minus length/360.

2.9 SOURCE QUALITY CONTROL

A. Provide testing of concrete mix.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.

3.2 PREPARATION

A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

3.3 ERECTION

A. Erect units without damage to shape or finish. Replace or repair damaged panels.

B. Erect units level and plumb within allowable tolerances.

C. Align and maintain uniform horizontal and vertical joints as erection progresses.

D. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.

E. Fasten units in place with mechanical connections.

F. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers. Pack grout to base of unit.

G. Exposed Joint Dimension: 1/2 inch. Adjust units so that joint dimensions are within tolerances.

3.4 TOLERANCES

A. Erect members level and plumb within allowable tolerances. Comply with PCI MNL-135, except as specifically amended below.

END OF SECTION

SECTION 03 54 00
CAST UNDERLAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Liquid-applied self-leveling floor underlayment.
   1. Use cementitious type at all locations.

1.2 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Alteration project procedures; selective demolition for remodeling.

B. Section 03 30 00 - Cast-in-place Concrete

1.3 REFERENCE STANDARDS

A. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

B. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars; 2019.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, mixing instructions, environmental limitations, and installation instructions.

C. Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's Instructions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with minimum three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section, and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

1.7 FIELD CONDITIONS

A. Do not install underlayment until floor penetrations and peripheral work are complete.

B. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and 72 hours after installation of underlayment.

C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cementitious Underlayment:
   1. ARDEX Engineered Cements; ARDEX V 1200 with ARDEX P51 Primer: www.ardexamericas.com/#sle.
   2. CMP Specialty Products; Level-1 with AS-100 Primer: www.cmpsp.com
   3. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
   4. Sika Corporation; Product Sikafloor Level 50.www.sikaconstruction.com

2.2 MATERIALS

A. Cast Underlayments, General:
   1. Comply with applicable code for combustibility or flame spread requirements.

B. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
   1. Compressive Strength: Minimum 4500 pounds per square inch after 28 days, tested per ASTM C109/C109M.
   2. Flexural Strength: Minimum 1000 psi after 28 days, tested per ASTM C348.
   3. Density: 125 pounds per cubic foot, nominal.
   4. Final Set Time: 1-1/2 to 2 hours, maximum.
   5. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
   6. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E 84.

C. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch in size and acceptable to underlayment manufacturer.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.

E. Primer: Manufacturer's recommended type.

F. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

2.3 MIXING

A. Site mix materials in accordance with manufacturer's instructions.

B. Add aggregate for areas where thickness will exceed 1 inch or as required per product manufacturer. Mix underlayment and water for at least two minutes before adding aggregate, and continue mixing to assure that aggregate has been thoroughly coated.

C. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.

B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.

C. Vacuum clean surfaces.

D. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

E. Close floor openings.

3.3 APPLICATION

A. Install underlayment in accordance with manufacturer's instructions.

B. Pump or pour material onto substrate. Do not retemper or add water.
   1. Pump, move, and screed while the material is still highly flowable.
   2. Be careful not to create cold joints.
   3. Wear spiked shoes while working in the wet material to avoid leaving marks.

C. Place to thickness indicated on Drawings or as required to achieve finished floor elevation, with top surface level to 1/16 inch in 10 ft.

D. For final thickness over 1-1/2 inches, place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin application of the subsequent layer within 24 hours.

E. Place before partition installation.

F. Where additional aggregate has been used in the mix, add a top layer of neat mix (without aggregate), if needed to level and smooth the surface.

G. If a fine, feathered edge is desired, initial preparation per manufacturers recommendations and steel trowel the edge after initial set, but before it is completely hard.

3.4 CURING

A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

B. Air cure in accordance with manufacturer's instructions.

3.5 FIELD QUALITY CONTROL

A. An independent testing agency will perform field inspection and testing, as specified in Section 01 40 00 - Quality Requirements.

B. Placed Material: Agency will inspect and test for compliance with specification requirements.

3.6 PROTECTION

A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.

B. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION

SECTION 04 01 00
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water cleaning of brick surfaces.

B. Replacement of architectural pre-cast stone units.

C. Repointing mortar joints.

D. Repair of damaged masonry.

1.2 RELATED REQUIREMENTS

A. Section 04 05 11 - Mortar and Masonry Grout.

B. Section 04 20 00 - Unit Masonry: Brick masonry units.

C. Section 04 20 00 - Unit Masonry: Mortar and grout.

1.3 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

B. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International; 2008.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate setting details of stone. Detail shoring.

C. Product Data: Provide data on cleaning compounds and helical masonry veneer anchors.

1.5 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
   1. Maintain one copy of each document on project site.

B. Restorer: Company specializing in masonry restoration with minimum three years of documented experience.

1.6 MOCK-UP

A. Locate where directed.

B. Mock-up may remain as part of the Work.

1.7 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Restoration and Cleaning Chemicals:
   1. Diedrich Technologies, Inc: www.diedrichtechnologies.com/#sle.
   2. HMK Stone Care System: www.hmkstonecare.com/#sle.
   3. PROSOCO: www.prosoco.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 CLEANING MATERIALS

A. Cleaning Agent: Detergent type.

2.3 MORTAR MATERIALS

A. Comply with requirements of Section 04 05 11.

2.4 MASONRY MATERIALS

A. Brick: Section 04 20 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces to be cleaned are ready for work of this section.

3.2 PREPARATION

A. Protect surrounding elements from damage due to restoration procedures.

B. Carefully remove and store removable items located in areas to be restored, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.

C. Separate areas to be protected from restoration areas using means adequate to prevent damage.

D. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

3.3 REBUILDING

A. Cut out damaged and deteriorated masonry with care in a manner to prevent damage to any adjacent remaining materials.

B. Support structure as necessary in advance of cutting out units.

C. Cut away loose or unsound adjoining masonry as directed.

D. Build in new units following procedures for new work specified in other section(s).

E. Mortar Mix: Colored and proportioned to match existing work.

F. Ensure that anchors are correctly located and built in.

G. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in all openings, accessories and fittings.

3.4 VENEER STABILIZATION

A. Install Helical Veneer Stabilization Anchors per manufacturers recommendations.

B. Spacing location and embedment as indicated on the drawings.

3.5 REPOINTING

A. Perform repointing prior to cleaning masonry surfaces.

B. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch depth or until sound mortar is reached.

C. Do not damage masonry units.

D. When cutting is complete, remove dust and loose material by brushing.

3.6 CLEANING NEW MASONRY

A. Verify mortar is fully set and cured.

B. Clean surfaces and remove large particles with wood scrapers, brass or nylon wire brushes.

3.7 RESTORATION CLEANING

A. Clean surfaces and remove large particles with wood scrapers or non-ferrous wire brush.

3.8 CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

END OF SECTION

SECTION 04 05 11
MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.2 RELATED REQUIREMENTS

A. Section 04 20 00 - Unit Masonry: Installation of mortar and grout.

B. Section 08 12 13 - Hollow Metal Frames: Products and execution for grouting steel door frames installed in masonry.

1.3 REFERENCE STANDARDS

A. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.

B. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.

C. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.

D. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.

E. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.

F. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.

G. ASTM C476 - Standard Specification for Grout for Masonry; 2018.

H. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2018a.

I. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2018, with Editorial Revision.

J. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).

K. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2018.

L. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2015.

M. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C 270 and test and evaluation reports per ASTM C 780 for aggregate ratio and water content, air content, consistency, and compressive strength.

E. Reports: Submit reports on grout indicating compliance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1.6 FIELD CONDITIONS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 MORTAR AND GROUT APPLICATIONS

A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials or made from factory premixed dry materials with addition of water only.

B. Mortar Mix Designs: ASTM C270, Property Specification.

2.2 MATERIALS

A. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

B. Portland Cement: ASTM C150/C150M.
   1. Type: Type I - Normal; ASTM C150/C150M.
   2. Color: Standard gray.

C. Masonry Cement: ASTM C91/C91M.
   1. Type: Type N; ASTM C91/C91M.

D. Hydrated Lime: ASTM C207, Type S.

E. Mortar Aggregate: ASTM C144, standard masonry type.

F. Grout Aggregate: ASTM C404, coarse.

G. Water: Clean and potable.

H. Bonding Agent: Latex type.

2.3 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, re-temper only within two hours of mixing.

E. Use mortar within two hours after mixing at temperatures of 90 degrees F or two-and-one-half hours at temperatures under 50 degrees F.

2.4 GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.2 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Install grout in accordance with ACI 530.1 Specifications for Masonry Structures and ASTM C476.

C. Work grout into masonry cores and cavities to eliminate voids.

D. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

E. Do not displace reinforcement while placing grout.

F. Remove excess mortar from grout spaces.

3.3 GROUTING

A. Perform all grouting by means of low-lift technique. Do not employ high-lift grouting.

B. Low-Lift Grouting:
   1. Limit height of pours to 24 inches.
   2. Limit height of masonry to 16 inches above each pour.
   3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.

4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 40 00 - Quality Requirements.

B. Test and evaluate mortar mix in accordance with ASTM C 780 procedures.

C. Test and evaluate grout mix in accordance with ASTM C 1019 procedures.

D. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C1314, and for flexural bond strength in accordance with ASTM C1072 or ASTM E518/E518M; perform tests and evaluate results as specified in individual masonry sections.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcement and anchorage.

B. Flashings.

C. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Control

B. Section 04 05 11 - Mortar and Masonry Grout.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.

D. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

B. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2018a.

C. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Handle and store pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

PART 2 PRODUCTS

2.1 MORTAR AND GROUT MATERIALS

A. Mortar and Grout: As specified in Section 04 05 11.

2.2 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. WIRE-BONDwww.wirebond.com/#sle.

B. Reinforcing Steel: Type specified in Section 03 30 00; size as indicated on drawings; uncoated finish.

C. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M, Class B.

D. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 3-1/2 inches.

2.3 FLASHINGS

A. Metal Flashing Materials: Copper, as specified in Section 07 62 00.

2.4 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
      b. WIRE-BOND: www.wirebond.com/#sle.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
      b. WIRE-BOND: www.wirebond.com/#sle.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. All material cleaning shall be done as recommended by material supplier.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

3.4 PLACING AND BONDING

A. Lay hollow masonry units with face shell bedding on head and bed joints.

B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

C. Remove excess mortar and mortar smears as work progresses.

D. Interlock intersections and external corners.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor retarder adhesive.

C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

D. Install cavity wall vents in veneer at 16 inch o.c. horizontally at top of exterior walls and below windowsills.

3.6 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.7 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

3.8 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at nonmasonry construction.

B. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

3.9 LINTELS

A. Install loose steel lintels over openings.

B. Maintain minimum 6 inch bearing on each side of opening.

3.10 GROUTED COMPONENTS

A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web unless noted otherwise on contract documents.

B. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.11 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Form expansion joint as detailed on drawings.

3.12 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.13 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.14 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and ductwork. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.15 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
   1. The agency shall monitor the proportioning, mixing, and consistency of mortar and grout; the placement of mortar, grout and masonry units; and the placement or reinforcing steel for compliance with the contract documents.

B. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

C. The agency shall prepare one set of prisms for testing at 7 days and one set for testing at 28 days. Tests are to be conducted by the agency for each 3,000 square feet of wall installed, but not less than two tests.

3.16 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.17 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

B. Protect base of walls from mud and mortar splatter.

C. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.

D. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members, support members.

B. Base plates, anchors.

C. Grouting under base plates.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Coordination and Project Conditions

B. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.

C. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2017.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

F. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2018.

G. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.

H. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).

I. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).

J. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.

K. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2018.

L. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.

M. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2018a.

N. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.

O. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.

P. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2018.

Q. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

R. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

U. SSPC-SP 3 - Power Tool Cleaning; 2018.

V. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

W. SSPC-SP 10 - Near-White Blast Cleaning; 2007.

X. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections.
   3. Indicate cambers.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Maintain one copy of each document on site.

C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience with current AISC Quality Management Systems (QMS) Certification, Certified Building Fabricator, BU.
   1. Non AISC certified companies are acceptable with the following requirements:
      a. A special inspector hired by the owner will be required to observe all fabrication of the structural steel for this project.
      b. The cost for the special inspection fees incurred during fabrication shall be reimbursed to the owner by the contractor.

D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

E. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.

F. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of New York.

G. Shop Painter: Company specializing in performing Work of this section with minimum 3 years documented experience with the following current AISC Certification:
   1. Sophisticated Paint Endorsement - Enclosed (P1)
   2. Sophisticated Paint Endorsement - Covered (P2)
   3. Sophisticated Paint Endorsement - Outside (P3)

H. Welders and Welding Procedures: AWS D1.1 Structural Welding Code - Steel, qualified within previous 12 months.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.

E. Steel Plate: ASTM A514/A514M.

F. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.

G. Headed Anchor Rods: ASTM F1554, Grade 36, plain.

H. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.

I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

J. Sliding Bearing Plates: Teflon coated.

K. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

L. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

2.3 FINISH

A. Prepare structural component surfaces in accordance with SSPC-SP 3.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
   1. Color: Gray

C. Galvanize structural steel members to comply with ASTM A 123/A 123M. Provide minimum 1.7 oz/sq ft galvanized coating. Galvanize after fabrication.

D. All exterior exposed steel to be galvanized.

E. Galvanizing for Fasteners, connectors and Anchors
   1. Hot-dipped Galvanizing: ASTM A153/A153M
   2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.4 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Shop test bolted and welded connections as specified for field quality control tests.

C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating work performed at fabricator's facility conforms to Contract Documents.
   1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.
   1. Verify bearing surfaces are at correct elevation.
   2. Verify anchor rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on shop drawings.

D. Field connect members with threaded fasteners; torque to required resistance. Tighten to snug tight for bearing type connections.

E. Do not field cut or alter structural members without approval of Architect.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances

B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

C. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing. 01 41 00 - Special Inspections.

B. Bolted Connections: Inspect in accordance with AISC specifications.
   1. Visually inspect all bolted connections.
   2. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.

C. Welded Connections: Inspect welds in accordance with AWS D1.1.
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Visually inspect all welds.
   3. Radiographic testing performed in accordance with ASTM E 94. Performed when directed by Architect/Engineer.
   4. Ultrasonic testing performed in accordance with ASTM E 164. Perform on all full penetration welds.
   5. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
   6. Magnetic particle inspection performed in accordance with ASTM E 709. Performed when directed by Architect/Engineer.

D. Correct defective bolted connections and welds.

END OF SECTION

SECTION 05 31 00
STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof deck.

B. Supplementary framing for openings up to and including 18 inches.

1.2 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches.

1.3 REFERENCE STANDARDS

A. ASCE 3 - Standard Practice for the Construction and Inspection of Composite Slabs.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.

E. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process; 2019.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

G. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

H. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

C. Certificates: Certify that products furnished meet or exceed specified requirements.

D. Submit manufacturer's installation instructions.

1.5 PERFORMANCE REQUIREMENTS

A. Design metal deck in accordance with SDI 29 Design Manual.

B. Design Loads:
   1. Gravity Dead Loads (Superimposed on roof deck) = 18 PSF

2. Live Loads
   a. Roof live load 20 psf min. (snow load used when greater)
   b. Roof snow load 41 psf+ drifting (where applicable)
   c. Ground Snow Load (Pg) =50 Psf + 3 Psf Elevation Adjustment
      1) Exposure Factor (Ce) =1.0
      2) Importance Factor (I) = 1.1
      3) Thermal Factor (Ct) =1.0
      4) Slope Factor (Cs) =1.00
   d. Floor Live Loads - NA
3. Wind Loads
   a. Basic Wind Speed (V) 117 Mph
      1) Allowable Design Wind Speed (Vasd) 90 Mph
         (a) Occupancy Risk Category III
         (b) Wind Exposure Category B
         (c) Kz = 0.7, Kzt = 1.0, Kd = 0.85, Ke = 1.0
         (d) Enclosed Building Gcpi = ±0.18
4. Roof Rain Load Data

1.6 QUALITY ASSURANCE

A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of New York.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Cut plastic wrap to encourage ventilation.

C. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Deck Manufacturers:
   1. United Steel Deck: www.unitedsteel.com
   2. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
   3. Epic Metals Corporation: www.epicmetals.com
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 STEEL DECK

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
   1. Calculate to structural working stress design and structural properties specified.
   2. Maximum Vertical Deflection of Roof Deck: 1/240 of span.

B. Roof Deck: Non-composite type, fluted steel sheet:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating conforming to ASTM A924/A924M.
   2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.

3. Structural Properties:
   a. Section Modulus: Se+=0.224 in^3/ft, Se-=0.229 in^3/ft .
   b. Span Design: Multiple.
4. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch unless noted otherwise on drawings.
5. Nominal Height: 1-1/2 inch.
6. Profile: Fluted; SDI WR.
7. Formed Sheet Width: 36 inch.
8. Side Joints: Lapped.
9. End Joints: Lapped, welded.
10. Flute Sides: plain vertical face

2.3 ACCESSORY MATERIALS

A. Welding Materials: AWS D1.1/D1.1M.

B. Fasteners: Galvanized hardened steel, self tapping.

C. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

E. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

F. Sheet Steel: ASTM A653, Grade 33 Structural Quality; with G90 galvanized coating conforming to ASTM A924

2.4 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips and cover plates, 20 gage thick sheet steel; of profile and size as indicated on drawings; finished same as deck.

B. Cant Strips: Formed sheet steel, 20 gage, .0359 inch minimum thickness, 45 degree slope, 3-1/2 inch nominal width and height, flange for attachment.

C. Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On concrete and masonry surfaces provide minimum 4 inch bearing.

C. On steel supports provide minimum 1-1/2 inch bearing.

D. Fasten deck to steel support members at ends and intermediate supports as indicated on drawings.

1. Welding: Use fusion welds through weld washers.

E. Male/female side laps shall be mechanically fastened with #10 self-tapping screws or welded with 1 1/2" seam welds.

F. At mechanically fastened male/female side laps fasten at 18 inches on center maximum.

G. At welded male/female side laps weld at 18 inches on center maximum.

H. Weld deck in accordance with AWS D1.3/D1.3M.

I. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.

J. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05 12 00.

K. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.

L. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

M. Close openings above walls and partitions perpendicular to deck flutes with double row of foam cell closures.

N. Seal deck joints, laps, ends and penetrations with sealant to achieve permanent air seal consistent with air barrier system specified in Section 07 25 00.

O. Place metal cant strips in position and fusion weld.

P. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

Q. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.3 FIELD QUALITY CONTROL

A. Welding: Inspect welds in accordance with AWS D1.1

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated steel and metal items, including:
   1. Lintels
   2. Structural supports for miscellaneous attachments
   3. Exterior Stair Nosings

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.

D. Section 05 52 13 - Pipe and Tube Railings.

E. Section 09 91 13 - Exterior Painting: Paint finish.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

G. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).

H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

I. NOMMA Guideline 1 - Joint Finishes

J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

L. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.5 QUALITY ASSURANCE

A. Design fabricated items under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of New York.

B. Finish joints in accordance with NOMMA Guideline 1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept metal fabrications on site in labeled shipments. Inspect for damage.

C. Protect metal fabrications from damage by exposure to weather.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Steel Plates: ASTM A 36/A 36M.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Slotted Channel Framing: ASTM A 653, Grade 33 Structural quality with galvanized coating.

F. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

G. Bolts, Nuts, and Washers:
   1. Bolts: ASTM F3125; Type 1
   2. Nuts: ASTM A 563 heavy hex type
   3. Washers: ASTM F 436; Type 1

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1, complying with VOC limitations of authorities having jurisdiction.
   1. Color: Gray

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

A. Lintels: Steel sections, size and configuration as detailed on drawings, length to allow 8 inches minimum bearing on both sides of opening.
   1. Galvanized and Prime paint, one coat

B. Other Structural Supports: Steel sections, shape and size as indicated on drawings required to support applied loads with maximum deflection of 1/240 of the span; prime paint, one coat.

C. Anchor bolts: ASTM F 1554; Grade 36, weldable, straight shape, Furnish with nut and washer; unfinished.

D. Exterior Stair Nosings: 4" Wide Cast aluminum with intergrate abrasive treads. Model #801 (Poured Concrete stairs) Model 801SP (Poured concrete-filled steel pan stairs) as manufactured by American Safety Tread Company Inc. Color: Natural Metal Finish.

2.4 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items as specified in drawings.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements; minimum 2.0 oz/sq ft coating thickness.

G. Galvanizing for Fasteners, Connectors and Anchors: Hot-Dipped Galvanizing to ASTM A 153/A 153M.

2.5 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

A. Welding: Inspect welds in accordance with AWS D1.1.

END OF SECTION

SECTION 05 52 13
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair railings and guardrails.

C. Free-standing railings at steps.

D. Balcony railings and guardrails.

1.2 REFERENCE STANDARDS

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

E. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating; 2011 (Reapproved 2017).

F. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.

G. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2016.

H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Include the design engineer's seal and signature on each sheet of shop drawings.

C. Delegated Design Data: As required by authorities having jurisdiction.
   1. Calculations shall take into account all vertical and lateral loads required by applicable building codes. Calculations shall show all reactions for connection to structural members

and shall be designed so that no eccentric or torsional forces are induced in the structural members.

2. Calculations shall be prepared by and signed and sealed by a structural Engineer licensed in the State of New York.

1.4 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of New York, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Handrails and Railings:
1. Blumcraft of Pittsburgh
2. Hollaender Manufacturing Co
3. Superior Aluminum Products, Inc

2.2 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.

B. Allow for expansion and contraction of members and building movement without damage to connections or members.

C. Dimensions: See drawings for configurations and heights.

D. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

E. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.3 STEEL RAILING SYSTEM

A. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

B. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

C. Exposed Fasteners: No exposed bolts or screws.

D. Straight Splice Connectors: Steel welding collars.

E. Galvanizing: In accordance with requirements of ASTM A123/A123M.
1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.4 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Anchor railings securely to structure.

D. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.

E. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/8 inch.

C. Maximum Out-of-Position: 1/8 inch.

END OF SECTION

SECTION 05 70 00
DECORATIVE METAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Railing and guardrail assemblies.

B. Free-standing railings at steps.

1.2 RELATED REQUIREMENTS

A. Section 01 74 19 - Construction Waste Management and Disposal: Additional requirements for cleaning.

B. Section 05 50 00 - Metal Fabrications: Supports.

C. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.3 REFERENCE STANDARDS

A. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013, with Editorial Revision.

B. AWS C3.4M/C3.4 - Specification for Torch Brazing; 2016.

C. AWS C3.5M/C3.5 - Specification for Induction Brazing; 2016 (Amended 2017).

D. AWS C3.9M/C3.9 - Specification for Resistance Brazing; 2009.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

F. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Schedule and conduct a preinstallation meeting one week before starting work of this section. Attendees shall include, but not be limited to:
   1. Contractor.
   2. Construction Manager
   3. Architect.
   4. Owner's representative.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Test Reports: Submit test reports from an independent testing agency showing compliance with specified design and performance requirements.

C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.6/D1.6M no more than 12 months before start of scheduled welding work.

B. Templates: Supply installation templates, reinforcing, and required anchorage devices.

1.7 MOCK-UPS

A. Provide mock-up of stair, railing system, freestanding center rail, wall-mounted handrail, guardrail, and smoke baffle system, 3'-0" +/- feet long by 3'-0" +/- feet wide, illustrating each type of material, cladding, and finish.

B. See Section 01 40 00 - Quality Requirements for additional requirements.

C. Locate where directed.

D. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in factory-provided protective coverings and packaging.

B. Protect materials against damage during transit, delivery, storage, and installation at site.

C. Inspect materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged parts and finishes, replace damaged items.

D. Prior to installation, store materials and components under cover in a dry location.

1.9 FIELD CONDITIONS

A. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F and maximum 95 degrees F.

B. Maintain ambient temperature of space at minimum 65 degrees F and maximum 95 degrees F for 24 hours before, during, and after railing installation.

1.10 WARRANTY

A. Warranty: Manufacturer's standard one year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 RAILING SYSTEMS

A. Railing Systems - General: Factory- or shop-fabricated in design indicated, to suit specific project conditions, and for proper connection to building structure, and in largest practical sizes for delivery to site.
   1. Performance Requirements: Design and fabricate railings and anchorages to resist the following loads without failure, damage, or permanent set; loads do not need to be applied simultaneously.
      a. Lateral Force: 75 lb minimum, at any point, when tested in accordance with ASTM E935.

b. Distributed Load: 50 lb/ft minimum, applied in any direction at the top of the handrail, when tested in accordance with ASTM E935.
c. Concentrated Loads on Intermediate Rails: 50 psf, minimum.
d. Concentrated Load: 200 lbs minimum, applied in any direction at any point along the handrail system, when tested in accordance with ASTM E935.

2. Assembly: Join lengths, seal open ends, and conceal exposed mounting bolts and nuts using slip-on non-weld mechanical fittings, flanges, escutcheons, and wall brackets.
3. Joints: Tightly fitted and secured, machined smooth with hairline seams.
4. Field Connections: Provide sleeves to accommodate site assembly and installation.
5. Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
   a. Ease exposed edges to a small uniform radius.
   b. Welded Joints:
      1) Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
      2) Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.
   c. Brass/Bronze Brazed Joints:
      1) Perform torch brazing in accordance with AWS C3.4M/C3.4.
      2) Perform induction brazing in accordance with AWS C3.5M/C 3.5.
      3) Perform resistance brazing in accordance with AWS C3.9M/C3.9.

B. Metal Railing: Engineered, post-supported railing system with metal infill.
1. Decorative Flanges for Embedded Posts: Circular, collared cover plate without screw holes.
2. Wall Mounted Components: Components necessary to support railing with 1-1/2 inch clearance from wall, and as follows:
3. Fasteners: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate and site conditions are acceptable and ready to receive work.

B. Verify field dimensions of locations and areas to receive work.

C. Notify Architect immediately of conditions that would prevent satisfactory installation.

D. Do not proceed with work until detrimental conditions have been corrected.

E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates, and supports for attachment of anchors.

3.2 INSTALLATION

A. Comply with manufacturer's drawings and written instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.

C. Anchor securely to structure.

D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

E. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

3.4 CLEANING

A. Remove protective film from exposed metal surfaces.

B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage the material or finish.

END OF SECTION

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Homer Central School District
88 South West Road
Homer, NY 13077

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Homer CSD - 2021 Capital Improvement Phase 1
Homer Central School District
88 South West Road
Homer, NY 13077
Hunt – 2503-036

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)
Hunt Engineers, Architects, Land Surveyors & Landscape Architect, DPC
Progress Plaza
1 Elizabeth Street, Suite 12
Towanda PA 18848

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:	_____	Signature:	_____
Name and Title:		Name and Title:	
Address:		Address:	

r ayifrfot ifeB emc eoDn aBiu ADisaBifofih

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 09:20:25 ET on 07/29/2022 under Order No. 2114339120 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Performance Bond, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rough opening framing for doors, windows, and roof openings.

B. Roof-mounted curbs.

C. Roofing nailers.

D. Roofing cant strips.

E. Preservative treated wood materials.

F. Fire retardant treated wood materials.

G. Miscellaneous framing and sheathing.

H. Concealed wood blocking, nailers, and supports.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

1.3 REFERENCE STANDARDS

A. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.; 2011

B. ANSI A208.1 - American National Standard for Particleboard; 2016.

C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2018.

F. PS 20 - American Softwood Lumber Standard; 2015.

G. SPIB (GR) - Grading Rules; 2014.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

C. Samples: For rough carpentry members that will be exposed to view, submit two samples, 4by10 inch in size illustrating wood grain, color, and general appearance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.3 EXPOSED DIMENSION LUMBER

A. Sizes: Nominal sizes as indicated on drawings.

B. Surfacing: S4S.

C. Moisture Content: S-dry or MC19.

2.4 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Stainless steel for high humidity and preservative-treated wood locations, hot dipped galvanized per ASTM A153/A153M elsewhere.
   2. Anchors: Toggle bolt type for anchorage to hollow masonry.
   3. Fasteners for roof replacements must be included in the Singly-Ply Roofing membrane manufacturer’s warranty to meet uplift pressures determined in accordance with the Applicable Code using a basic wind speed of 120 MPH.

2.5 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:

1. Manufacturers:
   a. Substitutions: See Section 01 60 00 - Product Requirements.
2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Do not use treated wood in direct contact with the ground.
3. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Treat rough carpentry items as indicated .
   c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.
1. Manufacturers:
   a. Substitutions: See Section 01 60 00 - Product Requirements.
2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treat lumber exposed to weather.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.4 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.5 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at each roof opening except where specifically indicated otherwise; form corners by alternating lapping side members.

END OF SECTION

SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Hardware.

C. Preparation for installing utilities.

D. Custom designed millwork and other items as detailed on drawings.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 09 65 00 - Resilient Flooring: Vinyl Base.

C. Section 12 36 00 - Countertops.

D. Division 22 - Plumbing utilities and fixtures.

E. Division 26 and 27 - Power, signal and data wiring.

1.3 REFERENCE STANDARDS

A. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ANSI A208.1 - American National Standard for Particleboard; 2016.

D. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012 (Reapproved 2017).

E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).

F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).

G. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.

H. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; 1996a (Validated 2013).

I. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.

J. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

K. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.

L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

M. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.
   1. Mock-up to be presented to Architect for approval during or just prior to this meeting.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum ten years of documented experience.
   1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
   2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

B. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

1.7 MOCK-UPS

A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.

B. See Section 01 40 00 - Quality Requirements for additional requirements.

C. Locate where directed.

D. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect units from moisture damage.

1.9 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

B. Do not install cabinets until all mortar, moisture and dust producing work is completed.

C. Provide portable fans and ventilate rooms receiving new casework for minimum of one week after installation of new cabinets. Continue operation of fans and ventilation of rooms until owner determines that all fumes related to cabinets have been dissipated.

D. Verify field measurements prior to fabrication.

1.10 REGULATORY REQUIREMENTS

A. Cabinets and cabinet finish system are to meet Class "C" rating or better for flame spread (200 or less) and shall have a smoke developed rating of less than 450.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Campbell Rhea Division Mohon International, Inc; Heritage Maple Series.

B. CiF Lab Solutions: www.cifsolutions.com.

C. Wood-Metal Division, Wood-Mode.

D. EM Pfaff & Son; (607) 739-3691.

E. Substitutions: See Section 01 60 00 - Product Requirements.

F. Single Source Responsibility: Provide this work from single fabricator.

2.2 CABINETS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Species of Veneer: Maple.

C. Cut or Slicing of Veneer: Plain / Flat Sliced.

D. Matching of Individual Leaves to Each Other: Book matching.

E. Matching Across the Panel Face: Pair matching.

F. Matching of Panels to Each Other: Sequence matched uniform size sets.

G. Cabinet Frame: Solid hardwood lumber with pinned mortise and tenon joints.

H. Stiles and Rails: Solid Maple lumber.

I. Wood Drawer Fronts: 3/4" thick solid Maple core with Maple veneer; Interior rabbeted edges with 3/8" exterior radiused edge.

J. Drawer Boxes: Solid hardwood lumber (1/2" thick) with dovetailed joints.

K. Drawer Bottoms: 1/4" hardwood plywood.

L. Cabinet Back: 1/4" hardwood plywood.

M. Cabinet Sides: 3/4" 7-ply hardwood plywood with Maple veneer on all exposed surfaces.
   1. Tall cabinets with 3/4" sides shall be constructed with a fixed center shelf rigidly attached to either side of the cabinet to prevent bowing of the sides.

N. Cabinet Tops: 1" hardwood plywood for all cabinet tops.

O. Cabinet Bottoms: 1" hardwood plywood for all wall cabinets.

P. Shelves: 1" hardwood plywood, full depth, for all shelves, interior or exposed.
   1. Maple plywood where exposed.
   2. Exposed plywood edge is to be covered with a factory applied one-piece 3/8” thick solid Maple nosing.

Q. Wood Doors:
1. Maple veneer over 3/4 inch x 1 1/8 inch wide solid Maple frame. Maple veneer to be on front and back of door. Interior rabbeted edges with 3/8" exterior radiused edge.
2. Tall cabinets to be 1 inch thick lipped reveal overlay style.
a. Core Construction: particleboard.

R. Exposed Edges: All exposed plywood edges are to be covered with a factory applied one-piece 3/8" thick solid Maple nosing.

S. Cabinet Baseboard: 3/4” hardwood plywood.

T. Finished Baseboard: 4” vinyl base. See finish schedule for color.

U. Wood Trim: Solid Maple lumber. Size as indicated on drawings.

V. Wood Veneer Faced Cabinet:
1. Exposed Surfaces: HPVA HP-1 Grade A, Ash, plain sliced, random-matched.
2. Semi-Exposed Surfaces: HPVA HP-1 Grade B, Ash, plain sliced, random-matched.
3. Concealed Surfaces: Manufacturer's option.

W. Cabinets:
1. Finish - Exposed Exterior Surfaces: Wood.
2. Finish - Exposed Interior Surfaces: Wood.
3. Finish - Semi-Exposed Surfaces: Wood
4. Finish - Concealed Surfaces: Manufacturer's option.
5. Door and Drawer Front Edge Profiles: 3/4" thick solid wood core with wood veneer; 3/8" radiused edge.
6. Door and Drawer Front Retention Profiles: Fixed panel.
7. Casework Construction Type: Type A - Frameless.
8. Interface Style for Cabinet and Door: Style 2 - Finish Inset; reveal overlay.
9. Grained Face Layout for Cabinet and Door Fronts: Style and Rail, all Grades.
10. Cabinet Design Series: As indicated on drawings.

2.3 PANEL MATERIALS

A. Veneer Faced Plywood Finish: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core of veneer (wood plies); type of glue recommended for specific application; thickness as required; face veneer as follows:
1. Exposed Surfaces: Grade AA, Maple, plain sliced, book-matched.
2. Semi-Exposed Surfaces: Grade A, Maple, rotary cut, random-matched.
3. Concealed Surfaces: Grade B, Maple, rotary cut, random-matched.

B. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with moisture resistant adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

C. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

2.4 LAMINATE MATERIALS

A. Refer to Finish Key & Schedule for placement and colors.

B. Manufacturers:
1. Formica Corporation: www.formica.com.
2. Panolam Industries International, Inc; Nevamar Standard HPL: www.panolam.com/#sle.
3. Wilsonart: www.wilsonart.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

C. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

D. Provide specific types as indicated.
   1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as indicated, finish as indicated.
   2. Vertical Surfaces: VGS / GP28, 0.028 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
   3. Post-Formed Surfaces: PF42, 0.042 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
   4. Cabinet Liner: CLS / CL20, 0.020 inch nominal thickness, through color, color as selected, finish as scheduled.
   5. Laminate Backer: BKL / BK20, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.5 COUNTERTOPS

A. Countertops: See Section 12 36 00.

2.6 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

E. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface. Provide 2" diameter grommet and cover at each computer work station and printer stations. Exact location to be verified in the field.

F. Tack Board and Fabric: Fiber Board: ASTM C208, cellulosic, dry type, 3/8" inch thick with 1/8" inch thick layer cork for a total thickness of 1/2" inch, Class A rated material.
   1. Provide at all casework wall cabinets. Refer to drawings for additional information.
   2. Tack board covering: Vinyl coated fabric roll stock, conforming to the following;
      a. Total Thickness: 9 mil.
      b. Total Weight: 14 oz/sq yd.
      c. Vinyl Finish Weight 18 oz/sq yd.
      d. Roll Width: 54 inches
      e. Pattern: Linen
      f. Over-coating Stain resistant Polyvinyl fluoride, .0005 inch thick.

2.7 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Bumper Pads: All moving items, including but not limited to, doors and drawers shall be provided with manufacturer's standard bumper pads to ensure quiet closure.

C. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for clip supports and coordinated shelf rests, for nominal 1-1/4" inch spacing adjustments.
   1. Shelf clip supports shall be dual peg, plastic, with minimum length of 2-1/4".
      a. Clips shall have integral hold down tabs to secure 3/4 and 1 inch shelves.
      b. Capacity: 300 pounds per clip.

D. Drawer and Door Pulls: Die cast aluminum pull, Brushed aluminum finish, 4" centers.

E. Cabinet Locks: Keyed cylinder, master keyed, steel with satin finish.
1. All locks within each room keyed the same. Each room keyed differently.
2. Provide four (4) keys per room.
3. Equip each lock with removable core, similar to Compx National locks.
4. Provide locks at all doors and drawers, unless noted otherwise in Contract Drawings.

F. Cabinet Catches and Latches:

G. Drawer Slides:
1. Type: Full extension.
2. Static Load Capacity: Heavy Duty grade; 200 lb, minimum.
3. Mounting: Side mounted.
4. Action to be progressive movement on precision ball bearings.
5. Stops: Integral type.
6. Manufacturers:
a. Fulterer USA; FR 5210: www.fultererusa.com.

H. Hinges: Butt, five knuckle disappearing type, 2-3/4 inch and .090 inch thick with hospital tips, steel with polished finish.

I. Sliding Door Track Assemblies: Upper and lower track of galvanized steel construction, ball bearing carriers fitted within tracks, multiple pendant suspension attachments for door .

J. Hooks: Double hooks, back mounted. Brushed Chrome finish.

2.8 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with 3/8" thick solid Maple nosing. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
2. Cap exposed plastic laminate finish edges with material of same finish and pattern.

E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify adequacy of backing and support framing.

C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets and counter bases to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

G. Provide and install all trim and filler panels required to fill in all gaps between casework, lockers and adjacent wall or ceiling surfaces or to provide closure of mechanical items. Provide a complete seamless installation. (Filler panels must also be installed in gaps on top of casework).
   1. Trim and filler panels to match material and finish of cabinets. Filler panels shall be of equivalent length at each side of each run of casework.

3.3 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting and balancing.

B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

C. Ensure finished work is free of all markings made during fabrication.

SECTION 07 05 53
FIRE AND SMOKE ASSEMBLY IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping

1.3 REFERENCE STANDARDS

A. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of marking, indicating font, foreground and background colors, wording, and overall dimensions.

C. Schedule: Completely define scope of proposed marking, and indicate location of affected walls and partitions, and number of markings.

D. Samples: Submit two samples of each type of marking proposed for use, of size similar to that required for project, illustrating font, wording, and method of application.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 FIELD CONDITIONS

A. Do not install adhered markings when ambient temperature is lower than recommended by label or sign manufacturer.

B. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Partition Identification Labels:
   1. Fire Wall Signs, Inc: www.firewallsigns.com/#sle.
   2. Safety Supply Warehouse, Inc: www.safetysupplywarehouse.com/#sle.
   3. Stencil Ease: www.stencilease.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FIRE AND SMOKE ASSEMBLY IDENTIFICATION

A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).

B. Adhered Fire and Smoke Assembly Identification Signs: Printed vinyl sign with factory applied adhesive backing.

C. Applied Fire and Smoke Assembly Identification: Identification markings applied to partition with paint or permanent ink and a code compliant stencil.

D. Location: On fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions; within concealed space where there is an accessible concealed floor, floor-ceiling, or attic space.

E. Languages: Provide sign markings in English.

F. Format: Whether adhered or applied, identification shall include, at a minimum:
   1. Lettering: Not less than three inches in height with a minimum 3/8 inch stroke, in contrasting color.
   2. Wording shall include, as applicable:
      a. Wall Type, i.e FIRE BARRIER or SMOKE BARRIER, or similar.
      b. Fire Resistance Rating, i.e. ONE HOUR, TWO HOUR, or similar.
      c. PROTECT ALL OPENINGS.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Locate markings as required by ICC (IBC).
   1. No more than fifteen feet from end of each rated wall.
   2. No more than thirty feet interval measured horizontally along the rated wall or partition.
   3. Rated walls shall be identified on each side.

B. Install adhered markings in accordance with manufacturer's instructions.
   1. Where adhered markings are used, a suitable Class A backer, permanently attached to the wall, may be used when wall surface would preclude adhesion.

C. Install applied markings in accordance with manufacturer's instructions.

D. Install neatly, with horizontal edges level.

E. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, underside of floor slabs, over roof deck, over roof sheathing, and interior wall with facer providing exposed finish.

B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.

C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.

B. Section 07 26 00 - Vapor Retarders: Separate vapor retarder materials.

C. Section 07 27 00 - Air Barriers: Separate air barrier materials.

1.3 REFERENCE STANDARDS

A. ASTM C240 - Standard Test Methods of Testing Cellular Glass Insulation Block; 2018.

B. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).

C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.

D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2019.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

I. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2019.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.5 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 APPLICATIONS

A. Insulation Over Roof Deck: Extruded polystyrene (XPS) board.

2.2 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation: ASTM C 578, Type IV; Extruded polystyrene board cellular type surface; with the following characteristics:
   1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
   5. All Extruded Polystyrene Board Insulation shall be HFC free.
   6. Board Thickness: As noted on drawings.
   7. Board Edges: Square.
   8. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
   9. Products:
      a. Dow Chemical Company: www.dowbuildingsolutions.com/#sle.
      b. Kingspan Insulation LLC: www.trustgreenguard.com/#sle.
      c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.

2.3 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   3. Formaldehyde Content: Zero.
   4. Thickness: As indicated on drawings.
   5. Facing: Unfaced.
   6. Products:
      a. CertainTeed Corporation: www.certainteed.com/#sle.
      b. Johns Manville: www.jm.com/#sle.
      c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
      d. Knauf Insulation GmbH: www.knaufinsulation.us.
   7. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 ACCESSORIES

A. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Adhere a 6 inches wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
   1. Tape seal joints.
   2. Extend sheet full height of joint.

B. Apply adhesive to back of boards:
   1. Three continuous beads per board length.

C. Install boards horizontally on foundation perimeter.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

D. Extend boards over expansion joints, unbonded to foundation on one side of joint.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

F. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.
   1. Install boards horizontally from base of foundation to top of insulation.
   2. Butt boards tightly, with joints staggered from insulation joints.

3.3 BOARD INSTALLATION AT CAVITY WALLS

A. Secure impale fasteners to substrate at following frequency:
   1. Six (6) per insulation board.

B. Adhere a 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
   1. Extend sheet full height of joint.

C. Install boards to fit snugly between wall ties.
   1. Place membrane surface facing out, and tape seal board joints.

D. Install boards horizontally on walls.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

F. Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.

3.4 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.5 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

A. Installation of board insulation over low slope roof deck, see drawings.

B. Board Installation Over Roof Deck, General:
1. See applicable roofing specification section for specific board installation requirements.
2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
3. Do not apply more insulation than can be covered with roofing on the same day.

3.6 BOARD INSTALLATION OVER STEEP SLOPE ROOF SHEATHING OR ROOF STRUCTURE

A. Installation of board insulation over steep slope roof structure or roof sheathing, see Section 06 10 00.

3.7 BATT INSTALLATION

A. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

D. Metal Framing: Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

F. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.

G. Coordinate work of this section with requirements for vapor retarder, see Section 07 26 00.

H. Coordinate work of this section with construction of air barrier seal, see Section 07 27 00.

3.8 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.9 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Water-resistive barrier under exterior cladding.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

1.2 DEFINITIONS

A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

1.3 REFERENCE STANDARDS

A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2019.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.5 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 WATER-RESISTIVE BARRIER MATERIALS

A. Water-Resistive and Air Barrier, Multilayers: Outer layers of nonwoven, spunbonded polypropylene with vapor permeable, watertight polymeric middle layer.
   1. Air Permeance: 0.0011 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 54 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F.
   3. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 3 months of weather exposure.

4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
5. Seam and Perimeter Tape: As recommended by sheet manufacturer.

2.2 ACCESSORIES

A. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
   1. Width: 4 inches.

B. Thinners and Cleaners: As recommended by water-resistive barrier manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Water-Resistive Barriers: Install continuous water-resistive barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Mechanically Fastened Exterior Sheets:
   1. Install sheets shingle-fashion to shed water, with seams aligned horizontal.
   2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
   3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.
   4. Attach to framed construction with fasteners extending through sheathing into framing, and space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
   5. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
   6. Where stud framing rests on concrete or masonry substrate, extend lower edge of barrier sheets at least 4 inches below bottom of framing and seal to substrate with sealant or approved mounting tape.
   7. Install water-resistive barrier over jamb flashings.
   8. Install head flashings under water-resistive barrier.
   9. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.

E. Self-Adhered Sheets:

1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle-fashion to shed water and seal laps airtight.
3. Upon placement of sheets, firmly press onto substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.

F. Openings and Penetrations in Exterior Water-Resistive Barriers:
1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Owner92s Inspection and Testing: Cooperate with Owner92s testing agency.
1. Allow access to work areas and staging.
2. Notify Owner92s testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
3. Do not cover work of this section until testing and inspection is accepted.

C. Do not cover installed water-resistive barriers until required inspections have been completed.

D. Obtain approval of installation procedures from water-resistive barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

3.5 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vapor retarders.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.

B. Section 06 10 00 - Rough Carpentry: Vapor retarders on exterior wall sheathing.

C. Section 07 21 00 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.

D. Section 07 53 00 - Elastomeric Membrane Roofing: Vapor retarder installed as part of roofing system.

E. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with vapor retarders.

1.3 DEFINITIONS

A. Vapor Retarder: Airtight barrier made of material that is relatively water vapor impermeable, to degree specified, with seams and joints sealed to adjacent surfaces.

B. Vapor Retarder Class: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class is defined using Procedure A, Desiccant Method at 73 degrees F and 50 percent Relative Humidity (RH), in accordance with ASTM E96/E96M and ICC (IBC)-2018, as follows:
   1. Class I: 0.1 perm or less.
   2. Class II: Greater than 0.1 perm to 1.0 perm.
   3. Class III: Greater than 1.0 perm to 10 perms.

1.4 REFERENCE STANDARDS

A. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

B. ICC (IBC)-2018 - International Building Code; 2018.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

1.6 MOCK-UPS

A. Locate where directed.

B. Mock-up may remain as part of work.

1.7 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 VAPOR RETARDER MATERIALS

A. Underslab Vapor Retarders: See Section 03 30 00.

2.2 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Vapor Retarder and Adjacent Substrates: As indicated, complying with vapor retarder manufacturer's installation instructions.

B. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and vapor retarder materials.
   1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch, nominal thickness.
   2. Color: Green.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.3 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Mechanically Fastened Sheets - Vapor Retarder On Interior:
   1. When insulation is installed within assembly, install vapor retarder over insulation.
   2. Seal seams, laps, perimeter edges, penetrations, tears, and cuts with self-adhesive tape, providing an airtight seal.
   3. Locate laps at framing members; at laps fasten one sheet to framing member then tape overlapping sheet to first sheet in shingle fashion to shed water.
   4. Seal entire perimeter to structure, window and door frames, and other penetrations.
   5. Where conduits, pipes, wires, ducts, outlet boxes, and other items are installed within insulation cavity, pass vapor retarder sheet behind these items and over insulation to maintain airtight seal.

E. Self-Adhered Sheets:
   1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
   2. Lap sheets shingle fashion to shed water and seal laps airtight.

3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.

F. Vapor Retarder Coatings:
1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.

G. Openings and Penetrations in Exterior Vapor Retarders:
1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto vapor retarder and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings with nonflanged frames, seal vapor retarder to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under vapor retarder extending at least 2 inches beyond face of jambs; seal vapor retarder to flashing.
5. At interior face of openings, seal gaps between window/door frame and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of vapor retarder.

3.4 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 27 00
AIR BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air barriers.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Air barrier under exterior cladding.

B. Section 06 10 00 - Rough Carpentry: Sheathing with integral air barrier.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with air barriers.

D. Section 09 21 16 - Gypsum Board Assemblies: Air barrier under exterior cladding.

1.3 DEFINITIONS

A. Air Barrier: Airtight barrier made of material that is virtually air impermeable but water vapor permeable, both to amount as specified, with sealed seams and sealed joints to adjacent surfaces.

1.4 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016.

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2019.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

F. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2019.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

1.6 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Evaluated Air Barrier Assemblies; www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

C. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

1.7 MOCK-UPS

A. Construct air barrier mock-up, 10 feet long by 10 feet wide, indicating application methods, sealants, flashings, terminations, and penetrations..

B. Locate where directed.

C. Mock-up may remain as part of work.

1.8 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)

A. Air Barrier Sheet, Self-Adhered:
   1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F.
   3. Water Penetration Resistance Around Nails: Pass, when tested in accordance with ASTM D1970/D1970M (modified).
   4. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 90 days of weather exposure.
   5. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
   6. Comply with NFPA 285 requirements for wall assembly.
   7. Seam and Perimeter Tape: As recommended by sheet manufacturer.
   8. Products:
      a. Carlisle Coatings and Waterproofing, Inc; Fire Resist 705 VP: www.carlisleccw.com/#sle.
      b. GCP Applied Technologies; Perm-A-Barrier VPS: www.gcpat.com/#sle.
      c. W. R. Meadows, Inc; Air-Shield SMP: www.wrmeadows.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Air Barrier, Fluid Applied: Vapor semi-permeable, elastomeric waterproofing.
   1. Air Barrier Coating:

a. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
b. Water Vapor Permeance: 11 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure B - Water Method, at 73.4 degrees F.
c. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 90 days of weather exposure.
d. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
e. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
f. Comply with NFPA 285 requirements for wall assembly.
g. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
h. VOC Content: Zero.
i. Sealants, Tapes and Accessories: As recommended by coating manufacturer.

2.2 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready for work of this section.

B. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.

C. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Self-Adhered Sheets:
1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle fashion to shed water and seal laps airtight.
3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer, to seal to adjacent substrates, and as flashing.

5. At wide joints, provide extra flexible membrane allowing joint movement.

E. Fluid-Applied Coatings or Membranes:
1. Prepare substrate in accordance with manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Where exterior masonry veneer is being installed, install masonry anchors before installing air barrier over masonry; provide airtight seal around anchors.
3. Apply bead or trowel coat of mastic sealant with minimum thickness of 1/4 inch along coating seams, rough cuts, and as recommended by manufacturer.
4. Use flashing to seal to adjacent construction and to bridge joints in coating substrate.

F. Openings and Penetrations in Exterior Air Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto air barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings with nonflanged frames, seal air barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under air barrier extending at least 2 inches beyond face of jambs; seal air barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating item and seal to air barrier surface.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Owner will provide testing services, and Contractor to provide temporary construction and materials for testing.

C. Do not cover installed air barriers until required inspections have been completed.

D. Obtain approval of installation procedures from air barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

3.5 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Elastomeric roofing membrane, adhered conventional application.

B. Insulation, flat and tapered.

C. Vapor retarder.

D. Deck sheathing.

E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.2 RELATED REQUIREMENTS

A. Section 05 31 00 - Steel Decking: Placement of acoustical insulation for deck flutes.

B. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

C. Section 07 25 00 - Weather Barriers

D. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashings, reglets.

E. Section 07 72 00 - Roof Accessories: Roof-mounted units; prefabricated curbs.

F. Section 22 10 05 - Plumbing Piping and Specialties: Roof drains.

1.3 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C728 - Standard Specification for Perlite Thermal Insulation Board; 2017a.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2019.

D. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016.

E. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2012).

F. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2014.

G. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method; 1983 (Reapproved 2018).

H. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

J. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

K. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2018.

L. FM DS 1-28 - Wind Design; 2016.

M. UL 1256 - Standard for Fire Test of Roof Deck Constructions; 2018.

N. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of associated counterflashings installed under other sections.

B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and setting plan for tapered insulation.

D. Samples for Verification: Submit two samples 6 by 6 inches in size illustrating insulation.

E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

B. All products including substrate boards, vapor retarders, insulation, fasteners, fastening plates and edgings must be manufactured and/or supplied by the roofing system manufacturer and covered by the warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store materials in weather protected environment, clear of ground and moisture.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Protect foam insulation from direct exposure to sunlight.

1.8 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 90 degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Correct defective work within a two year period after Date of Substantial Completion.

C. Provide 30 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.
   1. Warranty shall be a non-prorated, full system warranty with no dollar limit and shall include, but not limited to the following:
      a. Wind warranty coverage up to 90 MPH, three second gust at 33 feet above ground level.
         1) Certification is required with submittals indicating the manufacturer has reviewed and agreed to such wind coverage.
      b. Membrane material warranty on the field membrane.
      c. Puncture resistance.
      d. Signed by Manufacturer of primary roof materials and their authorized installer.
   2. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: www.carlisle-syntec.com/#sle.
   2. Firestone Building Products, LLC: www.firestonebpco.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation:
   1. Carlisle SynTec: www.carlisle-syntec.com.
   2. Firestone Building Products, LLC: www.firestonebpco.com
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ROOFING - UNBALLASTED APPLICATIONS

A. Elastomeric Membrane Roofing: Single ply membrane, fully adhered, over vapor retarder and insulation.

B. Roofing Assembly Requirements:
   1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
   2. The specified roofing assembly must have been successfully tested by a qualified testing agency to resist the design uplift pressures calculated according to:
      a. ANSI/SPRI WD-1 “Wind Design Standard Practice for Roofing Assemblies”
      b. American Society of Civil Engineers (ASCE 7)
      c. Applicable Building Code

3. Insulation Thermal Resistance (R-Value): 5.7 per inch, minimum LTTR; provide insulation of thickness required to attain a minimum R-Value of 30.

C. Acceptable Insulation Types - Constant Thickness Application:
1. Minimum 2 layers of polyisocyanurate board.

D. Acceptable Insulation Types - Tapered Application:
1. Tapered polyisocyanurate board.

2.3 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637/D4637M.
1. Thickness: 0.090 inch (90 mil).
2. Color: Black.
3. Tensile Strength: 1415 psi, measured in accordance with ASTM D412.
4. Tear Strength: 150 lbf per inch, measured in accordance with ASTM D624.
5. Brittleness Temperature: -49 degrees F, measured in accordance with ASTM D746.

B. Seaming Materials: Minimum 6 inch seam tape.

C. Vapor Retarder: Vapor retarder is a minimum 40 mil composite sheet consisting of a self-adhering rubberized asphalt membrane. The underlayment board shall be primed with Low VOC CCW-702 Primer or CCW Cav-Grip in accordance with manufacturer's specifications. Vapor retarder must have a perm rating of 0.05 or less as per ASTM E96/E96M. Vapor retarder must be rated by the manufacturer as a temporary roof with an allowable exposure to the elements for 90 days.

D. Flexible Flashing Material: Same material as membrane.
1. Thickness: 90 mil.
2. Tensile Strength: 1,415 psi.
3. Elasticity: 50 percent with full recovery without set.
4. Color: Black.

E. Liquid Flashing Material; Carlisle SynTec or approved equal:
1. VapAir Seal Flashing Foam.
2. LiquiSeal Flashing Fleece.
3. LiquiSeal Liquid Flashing Resin.
4. All components of liquid flashing system to be from a a single source manufacturer and be compatible with roofing membrane and design intent.

2.4 DECK SHEATHING AND COVERBOARD

A. Deck Sheathing and Coverboard: Insulation underlayment board shall be ½ inch. Insulation overlayment board shall be minimum 3/8 inch. Boards shall be an impact resistant, non-structural, fiber reinforced gypsum panel manufactured with a 95% certified recycled content, with moisture and mold resistance throughout the panel core and surface; manufactured to conform to ASTM C1278.
1. Manufacturers:
a. Carlisle SynTec: Securock.
b. Or Approved Equal.
c. Substitutions: See Section 01 60 00 - Product Requirements.

2.5 INSULATION

A. Perlite Board Insulation: Expanded perlite mineral aggregate, complying with ASTM C728.
1. Board Size: 24 by 48 inches.
2. Board Thickness: 1/2 inch.

3. Tapered Board: Slope as indicated; minimum thickness 2.5 inch; fabricate of fewest layers possible.
4. Board Edges: Square.

B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289, and meeting UL 1256, component of a Class A Roof System.
1. Classifications:
a. Type II:
1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
2. Board Size: 48 by 96 inches.
3. Board Thickness: 3.0 inch.
4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
5. Board Edges: Square.

2.6 ACCESSORIES

A. Prefabricated Roofing Expansion Joint Flashing: Sheet butyl over closed-cell foam backing seamed to galvanized steel flanges.

B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.

C. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle.

D. Membrane Adhesive: As recommended by membrane manufacturer.

E. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

F. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.

G. Insulation Adhesive: Two part low rise foam.

H. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.2 PREPARATION - CONCRETE DECK

A. Fill surface honeycomb and variations with latex filler.

B. Do not begin work until elevated concrete substrate has cured at least 28 days and moisture content is five percent or less.
   1. Test as Follows:
      a. Concrete Moisture Content: No beading water under plastic after 16 hours when tested in accordance with ASTM D4263.
      b. Relative Humidity in Concrete: Not greater than 75 percent when tested in accordance with ASTM F2170.

3.3 PREPARATION - METAL DECK

A. Install preformed acoustical glass fiber insulation strips in roof deck flutes in accordance with manufacturer's instructions; see Section 05 31 00.

B. Install deck sheathing on metal deck.
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.

C. Mechanically fasten sheathing to roof deck, 1 fastener every 2 sq. ft. in field & perimeter & 1 per 1 sq. ft in the corners..
   1. Surfaces to receive vapor barrier must be clean and dry.
   2. Prime all surfaces to receive vapor retarder. Prime in accordance with manufacturer's specifications.
   3. Prime only areas receiving vapor barrier on the same day. Reprime if area becomes dirty.

3.4 INSTALLATION - VAPOR RETARDER AND INSULATION, UNDER MEMBRANE

A. Apply rubberized asphalt self adhering vapor retarder to sheathed deck surface with adhesive in accordance with manufacturer's instructions.
   1. Apply vapor barrier from low point to high point, in a single fashion, so that laps will shed water.
   2. Overlap all edges 2 1/2 inches minimum. End laps shall be staggered.
   3. Place membrane carefully so as to avoid wrinkles and fishmouths.
   4. Immediately after installation, roll with a 100-150 pound weighted steel roller.
   5. Extend vapor retarder under cant strips and blocking to deck edge.
   6. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
      a. Coordinate with Section 07 25 00.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Attachment of Insulation:
   1. Embed first layer of insulation in adhesive beads 4" on center in accordance with roofing and insulation manufacturers' instructions.

D. Lay subsequent layers of insulation with joints staggered minimum 6 inches from joints of preceding layer.

E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes for support.

G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

H. Secure all insulation, staggering all joints, to the vapor retarder with adhesive in accordance with the manufacturer's specifications in beads 4" on center.

I. Insulation adhesive must have a nominal free-rise core density of 2.2 pounds per cubic foot, and be a 2 part low rise foam adhesive with 100% adhesion.

J. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.

K. Do not apply more insulation than can be covered with membrane in same day.

3.5 INSTALLATION - MEMBRANE

A. Roll out membrane, free from wrinkles, air pockets or tears. Place sheet into place without stretching.

B. Allow the membrane to relax for approximately 1/2 hour before bonding.

C. Fold the sheet back onto itself so half of the underside of the membrane is exposed.

D. Shingle joints on sloped substrate in direction of drainage.

E. Fully Adhered Application: Apply adhesive to substrate at rate of manufacturer's published instructions gal/square Fully embed membrane and substrate in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

F. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.

G. Fold back the unbonded half of the membrane sheet and repeat the bonding procedure.

H. Membrane Splicing: 6 inch pre-applied splice tape is required. All details and splice procedures shall be performed to meet or exceed the specified warranty requirements.
1. Overlap adjacent sheets and mark a line 1/2 inch out from the top sheet.
2. Fold the top sheet back and clean the dry splice area (minimum 6 inches wide) of the membrane with primer as required by the membrane manufacturer.
3. Apply primer to the EPDM sheet. Press membrane and tape onto the sheet using hand pressure.
4. Remove the release film and press the top sheet onto the tape using hand pressure.
5. Roll the seam toward the splice edge with a 2 inch wide steel roller.
6. Splice intersections are to be overlaid with 6" x 6" and 12"x12" T joint cover plates.

I. At intersections with vertical surfaces:
1. Extend membrane over cant strips and up a minimum of 6 inches onto vertical surfaces. Install expansion joints at locations where structures as separate
2. Fully adhere flexible flashing over membrane and up to termination bars. Install counterflashings and seal.
3. Do not extend membrane or membrane flashing over existing masonry weep holes or through wall flashing.

J. At gravel stops, extend membrane under gravel stop and to the outside face of the wall.

K. Around roof penetrations, seal flanges and flashings with flexible flashing.

L. Install roofing expansion joints where indicated. Make joints watertight.
1. Install prefabricated joint components in accordance with manufacturer's instructions.

M. Coordinate installation of roof drains and sumps and related flashings.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.2 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.

E. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2012 (Reapproved 2019).

F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

H. CDA A4050 - Copper in Architecture - Handbook; current edition.

I. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Perform work in accordance with ANSI/SPRI/FM 4435/ES-1 requirements for pull-off resistance to design wind pressure as defined by applicable local building code.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal, shop pre-coated with PVDF coating.
   1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

B. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 20 gauge, 0.032 inch thick; clear anodized finish.

C. Copper: ASTM B370, cold rolled 16 oz/sq ft, 24 gauge, 0.0216 inch thick; natural finish.

2.2 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.

F. Fabricate flashings to allow toe to extend 2 inches over roofing membrane. Return and brake edges.

2.3 GUTTER AND DOWNSPOUT FABRICATION

A. Seal metal joints.

2.4 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install scuppers to lines and levels indicated on Drawings. Seal top of reglets with sealant

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.3 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Seal metal joints watertight.

E. Secure gutters and downspouts in place with concealed fasteners.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 71 00
ROOF SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured roof specialties, including copings, fascias, and gravel stops.

B. Roof control and expansion joint covers.

C. Roof membrane vents.

1.2 RELATED REQUIREMENTS

A. Section 07 53 00 - Elastomeric Membrane Roofing – Fully Adhered

1.3 REFERENCE STANDARDS

A. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.

B. NRCA (RM) - The NRCA Roofing Manual; 2019.

C. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

1.5 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish manufacturer’s material and labor warranty to cover degradation of material finish.
   1. Term: Ten years after Date of Substantial Completion.
   2. Coverage: include color fading due to exposure to weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Control and Expansion Joint Covers:
   1. GAF: www.gaf.com/#sle.
   2. Johns Manville: www.jm.com/#sle.

3. MM Systems Corp: www.mmsystemscorp.com/#sle.

2.2 COMPONENTS

A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
   1. Configuration: Fascia, cant, and edge securement for roof membrane.
   2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.

B. Copings and Gravel Stops: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
   1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners. Include special supports spaced at 32 inches on center.
   2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
   3. Material: Formed aluminum sheet, 0.050 inch thick, minimum.
   4. Finish: 70 percent polyvinylidene fluoride.
   5. Color: To be selected by Architect from manufacturer's standard range.

C. Control and Expansion Joint Covers: Composite construction of 6-inch wide flexible EPDM flashing of white color with closed cell urethane foam backing, each edge seamed to aluminum sheet metal flanges, designed for nominal joint width of 1 inch. Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.

D. Reglet and Counterflashings:
   1. .040 extruded aluminum reglet with.032 formed aluminum counter flashing with stainless steel spring clips at 16” o.c. and stainless steel wind clips at 32” o.c.
      a. Finish of both reglet and counterflashing to be kynar paint.

E. Pipe Boots: Provide boot of material compatible with new roof system.
   1. Provide retrofit boot for existing pipes.
   2. Products: Pipe boot (new roof system) and retrofit pipe seals (existing roof system)

F. Multi-Pipe Portal System: Provide curb or base flange with rubber cap which will accept the size and number of pipes and/or conduit required. Materials are to be compatible with new roof system.
   1. Product: Provide boot similar to Quadraseal by Portals Plus, Inc.

2.3 FINISHES

A. Aluminum: High Performance Organic Finish; AAMA 605.2; multiple coat, conform to AA-M10-C41-RIXL, high performance pigmented organic coating with minimum 70% kynar fluoropolymer. Color as selected by Architect. Colors of fascia assembly to be available in the same color as counter flashings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

B. Field verify dimensions of metal fascia and coping. Verify adequate coverage of existing blocking and wall surface. Minimum of 2 inch lap required.

3.2 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Conform to SMACNA Architectural Sheet Metal Manual drawing details.

C. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

D. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

E. Coordinate installation of flashing flanges into reglets.

END OF SECTION

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof curbs.

B. Equipment rails.

C. Roof penetrations mounting curbs.

D. Skylight Safety Screens.

1.2 RELATED REQUIREMENTS

A. Section 07 71 00 - Roof Specialties: Other manufactured roof specialty items.

1.3 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders; current edition.

B. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices; Current Edition.

C. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

D. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 ROOF CURBS

A. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
   1. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
   2. Sheet Metal Material:
      a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
   3. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing system at 1:1 slope; minimum cant height 4 inches.
   4. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
      a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
      b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
      c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
      d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
   5. Provide layouts and configurations indicated on drawings.

B. Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
   1. Provide preservative treated wood nailers along top of curb.
   2. Insulate inside curbs with 1-1/2 inch thick fiberglass insulation.

C. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.

D. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches square unless otherwise indicated.

2.2 SKYLIGHT SAFETY SCREENS

A. Skylight Safety Screens: Heavy gauge galvanized welded wire screen.
   1. Screen: Comply with 29 CFR 1926, Subpart M for fall protection.
   2. Capable of installation on new or existing skylights without compromising skylight seal, weather tightness integrity, and with no degradatin of the glazing over time.
   3. Wire: 0.19 inch, minimum hot dipped galvanized wire.
   4. Welded grid of not more than 4 x 4 inch spacing.
   5. Products:
      a. DALYTE; Fall Protection Cages: www.dalyteusa.com.
      b. Simplified Safety; Model STS: www.simplifiedsafety.com.
      c. Velux; External Safety Screen: www.veluxusa.com.
      d. Or Approved Equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.4 CLEANING

A. Clean installed work to like-new condition.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.2 RELATED REQUIREMENTS

A. Section 01 35 17 - Alteration Project Procedures: Cutting and patching.

B. Section 07 05 53 - Fire and Smoke Assembly Identification.

1.3 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2019.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).

D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013 (Reapproved 2017).

E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

F. ITS (DIR) - Directory of Listed Products; current edition.

G. FM (AG) - FM Approval Guide; current edition.

H. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.

I. UL (DIR) - Online Certifications Directory; Current Edition.

J. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

1.5 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Trained by manufacturer.
   2. With minimum ten years documented experience installing work of this type.

1.6 MOCK-UPS

A. Install one firestopping assembly representative of each fire rating design required on project.
   1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.

B. If accepted, mock-up will represent minimum standard for this work.

C. If accepted, mock-up may remain as part of this work. Remove and replace mock-ups not accepted.

1.7 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Firestopping Manufacturers:
   1. 3M Fire Protection Products: www.3m.com/firestop.
   2. A/D Fire Protection Systems Inc: www.adfire.com.
   3. Hilti, Inc: www.us.hilti.com.
   4. Specified Technologies Inc: www.stifirestop.com/#sle.
   5. RectorSeal: www.rectorseal.com
   6. United States Gypsum Co.
   7. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

C. Fire Ratings: Refer to drawings for required systems and ratings.

2.3 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
   1. Movement: Provide systems that have been tested to show movement capability as indicated.

B. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
   1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
   2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
   3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
   4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.4 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

A. Concrete and Concrete Masonry Walls and Floors:
   1. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
      a. 2 Hour Construction: UL System HW-D-0755; 3M Co.; FireDam Spray 200.

B. Gypsum Board Walls:
   1. Head-of-Wall Joints at Concrete Over Metal Deck:
      a. 1 Hour Construction: UL System HW-D-0101, 3M Co.; FireDam Spray 200.

2.5 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

A. Blank Openings:
   1. In Floors or Walls:
      a. 2 Hour Construction: UL System C-AJ-0032; USG Inc.; Firecode Compound.

B. Penetrations Through Floors or Walls By:
   1. Uninsulated Metallic Pipe, Conduit, and Tubing:
      a. 2 Hour Construction: UL System C-AJ-1081; USG Inc.; Firecode Compound.
   2. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
      a. 2 Hour Construction: UL System C-AJ-22015; Rectorseal Sealant.
   3. Electrical Cables Not In Conduit:
      a. 3 Hour Construction: UL System C-AJ-3231; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
      b. 2 Hour Construction: UL System C-AJ-3045; USG Inc.; Firecode Compound.
   4. Insulated Pipes:
      a. 2 Hour Construction: Ul System C-AJ-5002; 3M Company FS-195+ / CP 25WB+
   5. HVAC Ducts, Uninsulated:
      a. 2 Hour Construction: UL System C-AJ-7036; Rectorseal Sealant

2.6 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

A. Blank Openings:
   1. 1 Hour Construction: UL System W-L-0031; 3M Company CP 25WB+

B. Penetrations By:
   1. Uninsulated Metallic Pipe, Conduit, and Tubing:
      a. 2 Hour Construction: UL System W-L-1001; 3M Company CP 25WB+
   2. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
      a. 1 Hour Construction: UL System W-L-2088; 3M Company CP 25WB+ / FB-3000 WT
   3. Electrical Cables Not In Conduit:
      a. 2 Hour Construction: UL System W-L-3218; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
      b. 1 Hour Construction: UL System W-L-3218; Specified Technologies Inc. EZ-Path Series 33 Fire-Rated Pathway.
      c. 1 Hour Construction: Ul System W-L-3195; 3M Company CP 25WB+
   4. Insulated Pipes:
      a. 1 Hour Construction: UL System W-L-5039; 3M Company CP 25WB+
   5. HVAC Ducts, Insulated:
      a. 1 Hour Construction: UL System W-L-7082; Rectorseal Sealants.

2.7 FIRESTOPPING SYSTEMS

A. Manufacturers:
   1. A/D Fire Protection Systems, Inc. .
   2. Dow Corning Corp. .
   3. Hilti Corp. .
   4. 3M fire Protection Products .
   5. Rectorseal Corp.
   6. United States Gypsum Co. .
   7. Substitutions: Section 01 60 00 - Product Requirements .

B. Firestopping:
   1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.3 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

C. Install labeling required by code.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements.

B. See Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

C. Inspect installed firestopping for compliance with specifications and submitted schedule.

D. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.5 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.6 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.3 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.

B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.

C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2018.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

E. Installation Plan: Submit at least four weeks prior to start of installation.

F. Installation Log: Submit filled-out log for each length or instance of sealant installed.

G. Executed warranty.

1.5 QUALITY ASSURANCE

A. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. Adhesion Testing: In accordance with ASTM C794.
   2. Compatibility Testing: In accordance with ASTM C1087.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver sufficient samples to manufacturer for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

B. Installation Plan: Include schedule of sealed joints, including the following:
   1. Installation Log Form: Include the following data fields, with known information filled out.
      a. Date of installation.
      b. Name of installer.
      c. Actual joint width; provide space to indicate maximum and minimum width.
      d. Actual joint depth to face of backing material at centerline of joint.
      e. Air temperature.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
      c. Other joints indicated below.
   3. Do not seal the following types of joints.
      a. Intentional weepholes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.
      e. Joints between suspended panel ceilings/grid and walls.

B. Type 1 - Exterior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

1. Type 1A - Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.

C. Type 2 - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.2 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 01 61 16.

B. Colors: As indicated on drawings.

2.3 NONSAG JOINT SEALANTS

A. Type 3 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's full range.
4. Service Temperature Range: Minus 40 to 180 degrees F.
5. Manufacturers:
a. Master Builders Solutions; MasterSeal NP2: www.master-builders-solutions.com/en-us/#sle.
b. Sika Corporation; Sikaflex-2c NS: www.usa.sika.com/#sle.
c. Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC: www.tremcosealants.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 SELF-LEVELING SEALANTS

A. Type 4 - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Provide slope grade sealant at all sloped pavement up to 12%.

2.5 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.2 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

SECTION 07 95 13
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Expansion joint cover assemblies for floor, wall, ceiling, and soffit surfaces.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of joint cover assembly frames in formwork.

B. Section 04 20 00 - Unit Masonry: Placement of joint cover assembly frames in masonry.

C. Section 05 50 00 - Metal Fabrications: Custom fabricated metal expansion and control joint devices.

D. Section 07 62 00 - Sheet Metal Flashing and Trim: Roof expansion and control joint covers.

1.3 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.

C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.

D. Samples: Submit two samples 4 inch long, illustrating profile, dimension, color, and finish selected.

E. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

1.5 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.6 FIELD MEASUREMENTS

A. Verify field measurements are as instructed by manufacturer.

1.7 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Provide 20 ft of resilient joint filler and one set of special tools required for accessing and servicing components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Expansion Joint Cover Assemblies:
1. Balco/Metalines
2. Pawling Corp
3. MM Systems Corp: www.mmsystemscorp.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

A. Interior Floor Joints Subject to Thermal Movement:

2.3 EXPANSION JOINT COVER ASSEMBLIES

A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
1. Joint Dimensions and Configurations: As indicated on drawings.
2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

B. Floor Joint Covers: Coordinate with indicated floor coverings.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.

B. Resilient Seals:

C. Threaded Fasteners: Aluminum.

D. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.2 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

3.3 PROTECTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit traffic over unprotected floor joint surfaces.

C. Provide strippable coating to protect finish surface.

END OF SECTION

SECTION 08 11 16
ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush aluminum doors with fiberglass reinforced plastic (FRP) face sheets.

B. Aluminum frames.

C. Flush door panels.

1.2 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware: Hardware for aluminum doors.

B. Section 08 80 00 - Glazing: Glazing materials for aluminum doors and frames.

1.3 REFERENCE STANDARDS

A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

B. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals; 2011.

C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

D. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

I. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2011.

J. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).

K. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2018).

L. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.

M. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.

N. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.

O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

P. IBC 2603.4.1.7 - Standard for Plastic Foam Insulation in Non-Rated Swinging Doors.

Q. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

R. ITS (DIR) - Directory of Listed Products; current edition.

S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.

T. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's descriptive literature for each type of door and frame; include information on fabrication methods, finishing, hardware preparation, installation, and maintenance instructions.

C. Shop Drawings: Include elevations of each opening type, details at each wall type, and schedule of openings.
   1. Verify dimensions by field measurements before fabrication and indicate on shop drawings.

D. Selection Samples: Complete set of color and finish options, using actual materials, for Architect's selection.

E. Test Report: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than ten years of documented experience.

B. The manufacturer or his representative shall be available for consultation to all parties engaged in the project including instruction to installation personnel.

C. Unless otherwise indicated, obtain doors and frames from a single company specializing in the type of construction required so that there will be undivided responsibility for the specified performance of all component parts including glazing for doors and factory installation of door hardware.

D. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.

B. Inspect delivered components for damage and replace. Repaired components will not be accepted.

C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.

D. Protect materials and finish from damage during handling and installation.

1.7 FIELD CONDITIONS

A. Do not begin installation of interior aluminum components until space has been enclosed and ambient thermal conditions are being maintained at levels consistent with final project requirements.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Provide written warranty signed by manufacturer, installer and contractor, agreeing to replace, at no cost to the Owner, any doors, frames or factory hardware installation against failure in materials or workmanship within the warranty period. Failure of materials or workmanship includes: excessive deflection, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering and defects in hardware installation. The minimum time period of warranty is ten years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets:
1. Special-Lite, Inc; SL-20 Sandstone: www.special-lite.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Aluminum Frames:
1. Special-Lite, Inc; SL-450TB: www.special-lite.com.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 DOORS AND FRAMES

A. Accessibility: Comply with ICC A117.1 and ADA Standards.

B. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets: Aluminum internal framing; no steel components.
1. Thickness: 1-3/4 inches.
2. Aluminum Finish: Superior performing organic coating.
3. Facing: Seamless, ultraviolet stabilized laminated FRP sheet.
a. Sheet Thickness: 0.12 inch, minimum.
b. Texture - FRP: Sandstone.
c. Surface Burning Characteristics:
1) Exterior Facing: Flame spread index (FSI) of 76 to 200, Class C, and smoke developed index (SDI) of 450 or less; when tested in accordance with ASTM E84.
2) Interior Facing: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less; when tested in accordance with ASTM E84.
d. Color: As selected by Architect from manufacturer's standard line.

4. Weatherstripping: Replaceable pile type; at jambs and head of exterior doors.

C. Aluminum Frames for Non-rated Doors, Sidelights, or Transoms: Extruded aluminum, thermally broken hollow sections; no steel components; open back framing shall not be accepted.
   1. Frame Depth: 4-1/2 inches.
   2. Frames for Fire-Rated Doors Specified Elsewhere: Tested in accordance with NFPA 252, listed and labeled by UL (DIR), ITS (DIR), or testing agency acceptable to authorities having jurisdiction.
   3. Finish: Same as doors.
   4. Weatherstripping: Replaceable pile type; at jambs and head.

D. Dimensions and Shapes: As indicated on drawings; dimensions indicated are nominal.
   1. Provide vision lites as indicated on drawings.
   2. Provide the following clearances:
      a. Hinge and Lock Stiles: 1/8 inch.
      b. Between Meeting Stiles: 1/4 inch.
      c. At Top Rail and Bottom Rail: 1/8 inch.

2.3 COMPONENTS

A. Flush Door Panels: Without visible seams on face sheet.
   1. Framing and Hardware Backup: Extruded aluminum tubing, 1/8 inch minimum thickness.
      a. Minimum 2-5/16 inch deep one-piece with integral reglets to accept face sheet on interior and exterior of door for flush appearance.
         1) Screw applied removable rail caps or other face sheet capture methods are not acceptable.
      b. Provide 3/16" angle blocks with hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions.
      c. Construct with mitered corners and provide joinery with 3/8" dia. full-width steel tie rods through extruded splines top and bottom as standard.
      d. Hardware Preparations: Factory reinforce, machine, and prepare for all specified hardware; obtain manufacturer's templates for hardware preparations. Factory install hardware.
   2. Exterior Doors Thermal Transmittance: U-value of 0.50, nominal, when tested in accordance with ASTM C1363.
   3. Core: Poured-in-place polyurethane foam insulating material of not less than 5 lb/cu ft density.
      a. Foam Plastic Insulated Doors: IBC 2603.4.
         1) Foam plastic shall be separated from the interior of a building by an approved thermal barrier.
         2) Approved thermal barrier must meet the acceptance criteria of the Temperature Transmission Fire Test and Integrity Fire Test as stated in NFPA 275.
         3) IBC 2603.4.1.7 foam plastic insulation, having a flame spread index less than 75 and a smoke developed index of not more than 450 shall be permitted as a door core when the face is metal minimum 0.032” aluminum or 0.016” steel.
         4) Standard door assembly shall be tested to show it meets these requirements without the use of thermal barrier. If no independent testing conducted all doors with foam plastic core must have a thermal barrier.
   4. Laminating Adhesive: Manufacturer's standard low-VOC materials.

B. Frames: Extruded aluminum shapes, not less than 0.125 inch thick, reinforced at hinge and strike locations.
   1. Corner Brackets: Extruded aluminum, fastened with stainless steel screws.
   2. Applied Door Stops: Extruded aluminum, not less than 0.125 inch thick, 0.625 high removable screw-in type with exposed fasteners.

a. Counterpunch fastener holes in door stop to preserve full metal thickness under fastener head.
b. At closer arm location, reinforce with solid bar stock for secure hardware attachment.

3. Caulk joints before assembling frame members. Secure joints with fasteners and provide a hairline butt joint appearance. Prefit doors to frame assembly at factory prior to shipment. Field fabrication of framing using "stick" materials is not acceptable.
4. Factory preassemble sidelights to greatest extent possible and mark frame assemblies according to location.

C. Manufacture doors with cutouts for vision lites as scheduled. Factory finish and install all glazing prior to shipment.

D. Vision Lites: Extruded aluminum framed, gasket glazed.
1. Glazing: See Section 08 80 00.

E. Astragals and Edges for Double Doors: Pairs of doors astragals, and door edge sealing and protection devices.
1. Provide manufacturer's standard astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.

F. Provide manufacturers standard concealed adjustable door bottom with dual brushes for up to 5/8-inch adjustment.
1. Special-Lite SL-301 or equal.

G. Additional Door Hardware: See Section 08 71 00.
1. All hardware with the exception of door closer, threshold and weatherstripping to be shipped to door manufacturer. Door manufacturer shall install hardware on doors and warranty attachment for ten years. Complete fabrication, assembly, finishing and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.

H. Replaceable Weatherstripping: AAMA 701/702 wool pile.

2.4 PERFORMANCE REQUIREMENTS

A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.

B. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties; Class C:
1. Izod Impact Resistance: ASTM D256, 7 ft lbf/inch of width, minimum, with notched izod.
2. Tensile Strength at Break: ASTM D638, 18,000 psi, minimum.
3. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F.
4. Flexural Strength: ASTM D790, 27,000 psi, minimum.
5. Barcol Hardness: ASTM D2583, minimum of 40 units.

C. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties; Class A:
1. Izod Impact Resistance: ASTM D256, 4.0 ft lbf/inch of width, minimum, with notched izod.
2. Tensile Strength at Break: ASTM D638, 7,000 psi, minimum.
3. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F.
4. Flexural Strength: ASTM D790, 14,000 psi, minimum.
5. Barcol Hardness: ASTM D2583, minimum of 45 units.

2.5 MATERIALS

A. Aluminum Sheet: ASTM B209/B209M, alloy 5005, temper H14, stretcher leveled.

B. Extruded Aluminum: ASTM B221 (ASTM B221M), alloy 6063, temper T5, or alloy 6463, temper T5.

2.6 FINISHES

A. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.

B. Color: As selected by Architect from manufacturer's standard line.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.7 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

B. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.

C. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil thickness per coat.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

B. Verify that frames installed by other trades for installation of doors of this section are in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.

B. Replace components with damage to exposed finishes.

C. Separate dissimilar metals to prevent electrolytic action between metals.

3.3 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.
   1. Provide thermal isolation where components penetrate or disrupt building insulation. Coordinate attachment and seal of perimeter air and vapor retarder materials. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

B. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.
   1. Install with anchors appropriate for wall conditions to anchor framing to wall materials.
   2. Secure head and sill members of transom, sidelights and similar conditions.
   3. Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support at mechanical joints with hairline fit at contacting members.

C. Set thresholds in bed of mastic and backseal.

D. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.

E. Hang doors and adjust hardware to achieve specified clearances and proper door operation.

F. Comply with glazing installation requirements, see Section 08 80 00.

3.4 CLEANING

A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.

B. Do not use abrasive, caustic, or acid cleaning agents.

3.5 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.

B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

SECTION 08 12 13
HOLLOW METAL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-fire-rated hollow metal frames for non-hollow metal doors.

B. Fire-rated hollow metal frames for non-hollow metal doors.

1.2 RELATED REQUIREMENTS

A. Section 08 14 16 - Flush Wood Doors: Non-hollow metal door for hollow metal frames.

B. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.

C. Section 08 80 00 - Glazing: Glazed borrowed lites.

D. Section 09 91 23 - Interior Painting: Field painting.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

L. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.

M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Samples: Submit one sample of frame metal, 2 by 2 inches, showing factory finishes, colors, and surface textures.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Hollow Metal Frames with Integral Casings:
1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.

2.2 PERFORMANCE REQUIREMENTS

A. Door Frame Type: Provide hollow metal door frames with integral casings.
1. Interior Doors: Use frames with integral casings.

B. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

C. Accessibility: Comply with ICC A117.1 and ADA Standards.

D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the

requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.

E. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
   1. Fabricate frames with hardware reinforcement plates welded in place.
      a. Hinge: Minimum 7 gauge x 1 5/8 x 10 inches.
      b. Lock Strike: Minimum 14 gauge x template requirements.

2.3 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

A. Type A, Interior Door Frames, Non-Fire Rated: Knock-down type.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 1 - Standard-duty.
      b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
   2. Frame Finish: Factory finished.

B. Type B, Fire-Rated Door Frames: Knock-down type.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 1 - Standard-duty.
      b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
   2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C or NFPA 252 ("positive pressure fire tests").
   3. Frame Finish: Factory finished.

2.4 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.5 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

B. Anchors:
   1. Stud Wall: Steel stud anchor.
   2. New Masonry: Adjustable masonry strap anchor.
   3. Existing Masonry: Counter sunk screw with sleeve.

2.6 EXISTING DOOR AND/OR FRAME ASSEMBLY FIRE INSPECTIONS

A. Independent testing agency requirements for fire rating inspections at existing doors and/or frames:
   1. Acceptable Testing Agencies: Guardian Testing Lab, 399 Prospect Avenue Buffalo, NY 14201-1139; www.firetesting.com.
   2. Doors and/or frames to be field tested in accordance with NFPA 101and ASTM E-119.
   3. Provide labels on doors and frames to state the acceptable fire rating requirement.
   4. See schedule on drawings for required locations.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Install door hardware as specified in Section 08 71 00.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated and non-rated.

1.2 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.

1.3 REFERENCE STANDARDS

A. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

B. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Full size door sample: Contractor to furnish one complete door unit at each project location to be randomly core sampled. Door to be selected by Architect in field. Door to be sampled would have similar hardware type to other doors to be provided.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

B. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.7 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Wood Veneer Faced Doors:
1. Masonite Architectural: www.architectural.masonite.com/#sle.
2. VT Industries, Inc: www.vtindustries.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 DOORS AND PANELS

A. Doors: See drawings for locations and additional requirements.
1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
1. Provide solid core doors at each location.
2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

2.3 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.4 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
1. Vertical Edges: Same species as face veneer.
2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
3. Veneer to be hot press applied to core.

2.5 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.

2. Provide solid blocking for other throughbolted hardware.

C. Fit door edge trim to edge of stiles after applying veneer facing. No exposed cross banding.

D. Bond edge banding to cores.

E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

G. Provide edge clearances in accordance with the quality standard specified.

2.6 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with same sealer to match door facing.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
1. Install fire-rated doors in accordance with NFPA 80 requirements and to requirements for fire rating label by UL or WH. Follow manufacturer's installation instructions for positive pressure doors.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.3 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall- and ceiling-mounted access units.

1.2 RELATED REQUIREMENTS

A. Section 04 20 00 - Unit Masonry: Openings in masonry.

B. Section 09 21 16 - Gypsum Board Assemblies: Openings in partitions.

C. Section 09 91 23 - Interior Painting: Field paint finish.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.

C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

D. ITS (DIR) - Directory of Listed Products; current edition.

E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

F. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.

E. Project Record Documents: Record actual locations of each access unit.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

A. Access door and frame units, fire-rated and non-fire-rated, in wall and ceiling locations.
   1. Provide for access to controls, valves, traps, dampers, cleanouts, and similar items requiring operation behind inaccessible finished surfaces.
   2. Coordinate exact locations with various trades to assure proper placement of access doors and panels.

B. Wall-Mounted Units:
   1. Location: As indicated on drawings, and additional locations as required.
   2. Panel Material: Steel.
   3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.

C. Fire-Rated Wall-Mounted Units:
   1. Location: As indicated on drawings, and additional locations as required.
   2. Wall Fire-Rating: To match rating of assembly in which unit is installed .
   3. Panel Material: Steel.
   4. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.

D. Ceiling-Mounted Units:
   1. Location: As indicated on drawings, and additional locations as required.
   2. Panel Material: Steel.
   3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.2 WALL- AND CEILING-MOUNTED ACCESS UNITS

A. Manufacturers:
   1. ACUDOR Products Inc: www.acudor.com/#sle.
   2. Cendrex, Inc: www.cendrex.com/#sle.
      a. Wall- and Ceiling-Mounted Units: Cendrex AHD, flush door, face frame, hinged.
      b. Fire-Rated Wall-Mounted Units - 2 Hours or Less: Cendrex PFI series, insulated.
      c. Fire-Rated Ceiling-Mounted Units: Cendrex PFI series, downward opening.
   3. Karp Associates, Inc: www.karpinc.com/#sle.
   4. Milcor, Inc: www.milcorinc.com/#sle.
   5. Nystrom, Inc: www.nystrom.com/#sle.

B. Wall- and Ceiling-Mounted Units: Factory-fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
   1. Style: Exposed frame with door surface flush with frame surface.
      a. Gypsum Board Ceiling Mounting Criteria: Use drywall bead type frame.
   2. Door Style Non-rated: Single thickness with rolled or turned in edges.
   3. Door Style Fire-Rated: Double-skinned hollow panel, insulated.
      a. Insulation: Non-combustible mineral wool.
   4. Frames: 16 gauge, 0.0598 inch, minimum thickness.
   5. Single Steel Sheet Door Panels: 16 gage, minimum thickness.
   6. Double-Skinned Hollow Steel Sheet Door Panels: 20 gage, .0359 inch, minimum thickness, on both sides and along each edge.
   7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.

a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.

8. Steel Finish: Primed.
9. Factory Primed: Polyester powder coat.
10. Hardware:
    a. Hardware for Fire-Rated Units: As required for listing.
    b. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
    c. Latch/Lock: Screw driver slot for quarter turn cam latch.
    d. Number of Locks/Latches Required: As recommended by manufacturer for size of unit.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings with plane of door and panel face aligned with adjacent finished surfaces. Secure rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

D. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

END OF SECTION

SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

1.2 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.

B. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

1.3 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

G. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

H. Submit NFRC 100- CMA Bid Report for the project showing compliance with the project thermal requirements at time of initial submission. Bid report shall be based on NFRC test sizes utilizing project specific glazing.

1.6 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of New York.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

C. Single Source Requirement: Unless otherwise indicated, obtain aluminum doors and storefront from a single company specializing in the type of construction required so that there will be undivided responsibility for the specified performance of all component parts. Manufacturer to fabricate storefront frames to greatest extent allowing for minimal field fabrication.

D. Hardware Attachment Fasteners: All hardware to be attached using machine fasteners only. Use of thread forming fasteners is not acceptable.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Warrant doors, storefront frames and factory supplied hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation and deterioration in finish or construction in excess of normal weathering.

C. Hardware Attachment: The workmanship and materials involved with the installation of hardware by the door manufacturer is guaranteed to be free of defects. Door Manufacturer shall install all hardware, except door closers. Hardware supplied with doors and frames shall be covered by the hardware manufacturer’s standard warranty.

D. Warranty Terms:
1. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

2. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
3. Provide Ten year warranty on attachment of factory installed hardware.
4. Cover complete system for failure to meet requirements.

PART 2 PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Position: center.
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
   3. Finish: Superior performing organic coatings.
   4. Thermal Performance: Installed system shall conform to the following minimum standards:
      a. Fabricator will be required to thermally model each head, sill and jamb, including adjacent construction, using thermal computer modeling software by an NFRC certified simulator to conform to the following:
      b. Inside air temperature of 72 degrees F at 30 percent RH and an outside air temperature of -10 degrees F with a 15 mph wind speed.
      c. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

B. Performance Requirements
   1. Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load or loads based on 120 mph wind speed, whichever is greater.
      a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   2. Overall U-Value Including Glazing:.36 Btu/ sq ft per hour per degree F, maximum, based on glass/spacer per specification section 08 80 00, and based on NFRC 100 sizes. Labeled and certified by manufacturer.
      a. Provide CMA NFRC Label certificate at close out of project.
      b. Provide CMA Bid Report as submittal prior to release to verify compliance.
      c. All testing shall be completed using specified glazing.
      d. CMA Report is for framing only, not the entrance doors.

2.2 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing Stops: Flush.
   3. Door stops: Supply screw applied door stops of .625-inch height with pile weather strip. At closer shoe location provide ½-inch solid aluminum bar stock for secure hardware attachment.
   4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel members as required.

5. Supply expansion mullions as required to accommodate seasonal expansion and contraction of systems.
6. Manufacturer to fabricate storefront frames to greatest extent possible.

B. Swing Doors: Glazed aluminum.
1. Special-Lite Inc; Product SL-20 Aluminum Door.
2. Thickness: 1-3/4 inches.
3. Face Sheet Thickness: 0.125 inches.
4. Top Rail: 6 1/2 inches wide.
5. Vertical Stiles: 4 3/4 inches wide.
6. Bottom Rail: 10 inches wide.
7. Mid-Rail: 8 inches wide.
8. Glazing Stops: Exterior glass stop shall vandal resistant integral to stiles and rails. Interior glass stop shall be screw applied.
9. Door Bottom: SL-301 Concealed Adjustable Door Bottom with dual brushes.
10. Meeting stiles of pairs: Manufacturers full height adjustable astragal.
11. Corner Joinery: Supply corner joint consisting of two piece mortise and tenon type physically interlocked. Provide full-width 3/8 inch galvanized steel tie rods secured with locking hex nuts at each horizontal rail.
12. Finish: Same as storefront.

C. Louvers: In window / storefront units where shown on drawings shall be model H manufactured by Penn Ventilating Co. Inc. to fully integrate with width of window unit.
1. Type: Type 2 deep storm proof with blades on 30 degree slope, heavy channel frame, bird screen with 1/2" square mesh.
2. Fabrication: .063 inch thick extruded aluminum with factory anodized finish, color to match frame color that louver is placed within.
3. Mounting: To be mounted into window / storefront unit per window / storefront manufacturer.
4. Maximum allowable static pressure shall not exceed 0.1" at 750 fpm free area velocity.
5. Coordinate installation of louver with HVAC contractor.

D. Preformed Aluminum Trim Covers: Provide preformed aluminum trim at new exterior frames where new frames meet existing construction to achieve a finished look. Dimensions to be verified in the field.

2.3 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M); 6063 alloy, T5 temper typical. 6061 alloy, T6 temper for extruded structural members.

B. Sheet Aluminum: ASTM B 209 (ASTM B209M); 5005 alloy, H15 or H34 temper.

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Fasteners: Stainless steel.

E. Exposed Flashings: 0.062 inch thick aluminum sheet; finish to match framing members.

F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

G. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

H. Self-sticking labels compliant with Industrial Code Rule No. 47: Transparent glass doors, fixed adjacent transparent glass sidelights and full height window systems shall be marked in two areas on the glass surface thereof. One such area shall be located at least 30, but not more than 36 inches and the other at least 60, but not more than 66 inches above the ground, The marking design shall be at least four inches in diameter if circular or four inches in its least

dimension if elliptical or polygonal. or shall be at least 12 inches in horizontal dimension if the marking is less than four inches in its least dimension. In no event shall the vertical dimension of any marking including lettering be less than one and one-half inches in height.

2.4 FINISHES

A. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.5 HARDWARE

A. Other Door Hardware: See Section 08 71 00.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Door Bottom: Manufacturer to supply and install concealed adjustable dual brush door bottom with up to 5/8 inch adjustment.

D. Adjustable Astragal: Manufacture to supply and install adjustable full height astragal for pairs of doors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

A. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.

3.5 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

3.7 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum windows with fixed sash, operating sash, and infill panels.

B. Site glazing.

C. Operating hardware.

D. Insect screens.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Steel lintels.

B. Section 06 10 00 - Rough Carpentry: Rough opening framing.

C. Section 07 25 00 - Weather Barriers: Sealing frame to water-resistive barrier installed on adjacent construction.

D. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

I. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

K. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

L. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2017.

M. NFRC 100 - Procedures for Determining Fenestration Product U-Factors and Solar Heat Gain Coefficients at Normal Incidence.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.

C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.

D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
1. Evidence of AAMA Certification.
2. Evidence of WDMA Certification.
3. Evidence of CSA Certification.
4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

G. Submit NFRC 100- CMA Bid Report for the project showing compliance with the project thermal requirements at time of initial submission. Bid report shall be based on NFRC test sizes utilizing project specific glazing.

1.5 QUALITY ASSURANCE

A. Aluminum Windows: Fabricate window assemblies in accordance with AAMA 101 for types of windows required.

B. Insulated Glass: Fabricate insulated glass units in accordance with GANA (formerly FGMA) Glazing Manual.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

A. Section 01 60 00 - Product Requirements

B. Do not install sealants when ambient temperature is less than 40 degrees F.

C. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 ALUMINUM WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
   1. Frame Depth: 4 1/2" inch.
   2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
   3. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.
   7. Thermal Performance: Installed system shall conform to the following minimum standards:
      a. Fabricator will be required to thermally model each head, sill and jamb, including adjacent construction, using thermal computer modeling software by an NFRC certified simulator to conform to the following:
      b. Inside air temperature of 72 degrees F at 30 percent RH and an outside air temperature of -10 degrees F with a 15 mph wind speed.
      c. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

B. Fixed, Non-Operable Type:
   1. Construction: Thermally broken.
   2. Exterior Finish: Class II natural anodized.
   3. Interior Finish: Class II natural anodized.

C. Horizontal Sliding Type:
   1. Construction: Thermally broken.

2. Provide screens.
3. Exterior Finish: Class II natural anodized.
4. Interior Finish: Class II natural anodized.

D. Single-Hung Type:
1. Construction: Thermally broken.
2. Provide screens.
3. Exterior Finish: Class I natural anodized.
4. Interior Finish: Class I natural anodized.

2.2 PERFORMANCE REQUIREMENTS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
1. Performance Class (PC): R.

B. Design Pressure (DP): In accordance with applicable codes.

C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.

D. Air Leakage: 0.1 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.

2.3 COMPONENTS

A. Frames: 4 inch wide by 4 inch deep profile, of 4 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.

B. Subframe (Receptor System): .070 inch minimum thickness extruded aluminum, 6065 T6; one piece full width or height of opening.

C. Sills: 4 inch thick, extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening; jamb angles to terminate sill end.

D. Infill Panel: 2 inch thick aluminum.

E. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
1. Hardware: Spring loaded steel pins; four per screen unit.
2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
3. Frame Finish: Same as frame and sash.
4. Screens at rescue windows shall be hinged or sliding and shall be operable from the inside with one hand, and without the use of a key or other device.

F. Operable Sash Weatherstripping: Resilient plastic; permanently resilient, profiled to achieve effective weather seal.

G. Fasteners: Stainless steel.

H. Glazing Materials: See Section 08 80 00.

I. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

J. Rescue Window Labels: Provide self-sticking labels of size and color to meet applicable code requirements and to match existing labels.
1. Labels are to be provided at all student occupied spaces.
2. Labels are to have the following criteria:
a. Bright yellow background with black letters.
b. Size: 3 inches by 5 inches
c. Text: "Rescue Window" readable from each side of the window.

d. Any window covers must also have labels.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H12 or H14 temper.

2.5 HARDWARE

A. Sash lock: Lever handle with cam lock.

B. Operator: Lever action handle fitted to projecting sash arms with limit stops.

C. Pulls: Manufacturer's standard type.

2.6 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41, clear anodic coating not less than 0.7 mil thick.

B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32, integrally colored anodic coating not less than 0.4 mil thick.

C. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.

D. Operator and Exposed Hardware: Enameled to color as selected from manufacturer's standard line.

E. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 07 25 00.

3.2 PRIME WINDOW INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Install operating hardware not pre-installed by manufacturer.

G. Install glass and infill panels in accordance with requirements; see Section 08 80 00.

3.3 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

END OF SECTION

SECTION 08 62 00
UNIT SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Skylights with integral frame.

B. Integral insulated curb.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood framing for rough opening.

B. Section 07 72 00 - Roof Accessories: Manufactured curbs for installation of unit skylights.

C. Section 07 72 00 - Roof Accessories: Safety screen system at unit skylights.

1.3 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

D. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2019c.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.
   4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not less than three years documented experience.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Unit Skylights:
   1. DĀLYTE, an AiA Industries Company; Polygon Skylights: www.dalyteusa.com/#sle.
   2. American Skylights a division of the Andi Group; Standard Curb Mount (Model CM): www.americanskylights.com/#sle.
   3. Artistic Skylight Domes Limited: www.artisticskylight.com/#sle.
   4. Kingspan Light + Air, LLC; formerly Bristolite Daylighting Systems, Inc: www.bristolite.com/#sle.

2.2 SKYLIGHTS

A. Skylights: Factory-assembled glazing in aluminum frame, free of visual distortion, and weathertight.
   1. Shape: Square dome.
   2. Glazing: Double.
   3. Operation: None; fixed.

2.3 PERFORMANCE REQUIREMENTS

A. Provide unit skylights that comply with the following:
   1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific skylight type:
   2. Allow for expansion and contraction within system components caused by a cycling surface temperature range of 170 degrees F without causing detrimental effects to system or components.

2.4 DESIGN CRITERIA

A. Unit Skylight Design: Design and size components to withstand dead loads and live loads caused by snow, hail, and positive and negative wind loads acting on skylight unit without damage or permanent set.
   1. Regulatory Requirements: Comply with applicable code criteria for loads, including seismic loads.

2.5 COMPONENTS

A. Double Glazing: Polycarbonate plastic; factory sealed.

B. Frames: ASTM B221 (ASTM B221M) Extruded aluminum thermally broken, reinforced and welded corner joints, integral curb frame mounting flange and counterflashing to receive roofing flashing system, with integral condensation collection gutter, glazing retainer; clear anodized finish.

2.6 ACCESSORIES

A. Safety Screen System: See Section 07 72 00 for additional information.

B. Protective Back Coating: Zinc molybdate alkyd.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that openings and substrate conditions are ready to receive work of this section.

3.2 PREPARATION

A. Apply protective back coating on aluminum surfaces of skylight units that will be in contact with cementitious materials or dissimilar metals.

3.3 INSTALLATION

A. Install unit skylights in accordance with manufacturer's instructions and ASTM E2112.

B. Install aluminum curb assembly, fastening securely to roof decking; flash curb assembly into roofing system.

C. Install skylight units and mount securely to curb assembly; install counterflashing as required.

D. Apply sealant to achieve watertight assembly.

3.4 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Wash down exposed surfaces; wipe surfaces clean.

C. Remove excess sealant.

END OF SECTION

SECTION 08 63 00
METAL-FRAMED SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum skylight framing system.

B. Skylight glazing with integral curb.

C. Fasteners, anchors, reinforcement, and flashings.

1.2 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Structural support framing for system.

B. Section 05 50 00 - Metal Fabrications: Fabricated steel attachment devices.

C. Section 06 10 00 - Rough Carpentry: Wood support curbs.

D. Section 07 25 00 - Weather Barriers.

E. Section 07 62 00 - Sheet Metal Flashing and Trim: Skylight counterflashing.

F. Section 07 72 00 - Roof Accessories: Safety screen system at skylights.

G. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

B. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2017.

C. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

E. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

F. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

G. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

I. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications; 2019.

J. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

K. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

M. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.

N. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

O. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2016.

P. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics; 2019.

Q. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2018).

R. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2018.

S. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

T. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

U. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

V. Flat Glass Manufacturers Association (FGMA): Glazing Manual.

W. Insulating Glass Certification Council (GCC): Classification of Insulating Glass Units.

X. Federal Specification Unit - FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's specifications, standard details and installation requirements. Provide system and component dimensions, components within assembly anchorage and fasteners, drainage details and flow diagrams.

C. Shop Drawings: Indicate framed opening requirements and tolerances, spacing of members, anticipated deflection under load, affected related work, expansion and contraction joint locations and details, and sizes and locations for field welding.
   1. Identify all shop and field welds on shop drawings.
   2. provide field measurements on shop drawings.

D. Samples: Two samples, not less than 12 by 12 inches in size illustrating appearance of prefinished aluminum and specified glazing system, including glazed edge and corner.

E. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.

F. Manufacturer's Installation Instructions: Indicate special procedures, safety precautions, and perimeter conditions requiring special attention.

G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

H. Certifications:
1. Certification that adhesion of sealant to samples of metal and glass is adequate when tested in accordance with ASTM C794.
2. Certification that materials in contact with sealant are compatible with sealant after being exposed to 2,000-4,000 microwatt ultra-violet radiation for 21 days.
3. Statement that stress on each detailed sealant joint will not exceed design stress of sealant when exposed to specified wind loads.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Design skylight system under direct supervision of a professional engineer experienced in design of system type specified and licensed in the State of New York.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not fewer than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide wrapping to protect prefinished aluminum surfaces. Do not use adhesive papers or spray coatings that bond when exposed to sunlight or weather.

1.7 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Certify that skylight frame is free of defects in design, material, and construction. Warrant installed assembly against moisture penetration for ten years after substantial completion

C. Correct defective work, including leaks, discoloration, failure of seal at insulated glazing units, and excessive thermal or structural movement, within a five year period after Date of Substantial Completion.

D. Warrant glass against defective materials, delamination, seal failure, and defects in manufacture for ten years after substantial completion. Glass breakage is not warranted

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal-Framed Skylights Manufacturers:
1. DĀLYTE, an AiA Industries Company; Ridge Skylights: www.dalyteusa.com/#sle.
2. Architectural Skylight Company
3. Naturalite Skylight Systems
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 METAL-FRAMED SKYLIGHTS

A. Metal Framed Skylights: Factory-fabricated, and glazed.
1. Frame: Extruded aluminum structural members with integral condensation collection and guttering system thermally separated from exterior pressure bar.
2. Glazing System: Pressure glazing bar system for sloped joints and two (2)-sided structural sealant glazing (SSG) for horizontal joints.
3. Glazing: Insulating glass.
4. Aluminum Finish: High performance organic coatings.

5. Fabricate to prevent vibration harmonics, thermal movement transmitted to other building elements, and loosening, weakening, or fracturing of attachments or components of system.

2.3 MATERIALS

A. Glass And Glazing Materials
   1. 1-5/16" insulated glass consisting of: 1/4" tempered, exterior light; 1/2" airspace filled with Argon gas; and 9/16" clear laminated heat strengthened interior light with a 0.060 inch PVB interlayer.
      a. Heated Treated Glass: ASTM C1048, with surface stress of 5,000 +/- 1,500 psi.
      b. Laminated Glass: Two lights interleaved with polyvinyl butyral (PVB). Units must meet criteria of ANSI Z97.1-1984 and CPSC 16 CFR 1201 for safety glazing. Provide PVB layer of 0.060" for heat strengthened units.
      c. Insulating Glass: CBA rated by the Insulating Glass Certification Council (IGCC) when tested in accordance with ASTM E773 and ASTM E774. Dual edge seals with the secondary seal being silicone. Exterior light of fully tempered glass and interior light of laminated glass.
      d. Exterior glass to have Solarban 60 Low-E film applied to the second surface. Interior laminated glass to be clear.
         1) Visible light transmittance: 48%
         2) Solar Transmittance: 29%
         3) Solar Factor: .36
   2. Glazing Strips:
      a. Extruded EPDM rubber designed to comply with the following specifications:
         1) Hardness: ASTM D2240 Type A 55 +/- 5 durometer.
         2) Tensile Strength: ASTM D412 1800 psi (min.).
         3) Elongation: 500% (min.).
         4) Color: Black.
      b. Compression Set: ASTM D395 Method B, 22 hours @ 212 degrees F: 25% (max.).
      c. Heat Aging Characteristics:
         1) 70 hours @ 212 degrees F.
         2) ASTM D2240 Hardness Change: +5 durometer.
         3) ASTM D412 Tensile Change: -10%.
         4) ASTM D412 Elongation Change: -20%.
      d. ASTM D1171 Weather Resistance at 1 Part Ozone Per Million, 500 Hours at 20% Elongation: No cracks.
      e. No visual checks, cracks or breaks after completion of tests.
   3. Setting Blocks
      a. Extruded Type II silicone rubber designed to permit adhesion and comply with the following specifications:
         1) Hardness: ASTM D2240 Type A 80 +/- durometer.
         2) Color: Black.

B. Frames: ASTM B 221 Extruded aluminum thermally broken, reinforced and welded corner joints, integral curb frame mounting flange and counterflashing to receive roofing flashing system, with integral condensation drainage gutter, glazing retainer.

C. Support Curbs: ASTM B 209 Sheet aluminum, sandwich construction; 1 inch thick, 10 inches high; rigid insulation; with integral flange for anchorage to roof deck.

D. Aluminum Extrusions: 6063-T5, 6063-T6, or 6061-T6 members complying with [ASTM B221].

E. Formed Aluminum: Sheet material of alloy 5052, 5005, or 6061-T6 complying with [ASTM B209].

F. Internal Reinforcement: [Aluminum] [ASTM A36/A36M steel shapes] [Aluminum or ASTM A36/A36M steel shapes] as required for strength and mullion size limitations. [Galvanized after fabrication.

2.4 ACCESSORIES

A. Glazing Accessories: As specified under components and Specified in Section 08 80 00.

B. Flashings: 5005 H34 aluminum, 20-gage thick same metal type, thickness, and finish as [roof flashing metal] [skylight frame], and secured with [concealed] [exposed to view] fastening method.

C. Touch-Up Primer for Galvanized Steel Surfaces: Zinc rich type SSPC 15, Type 1, Red Oxide.

D. Protective Coating: Bituminous coating, FS TT-C-494, Type II.

E. Fasteners: ASTM A193 B8, 300 Series stainless steel.[Stainless steel] [Galvanized steel] [Aluminum] [Non-corrosive type as recommended by skylight manufacturer].

F. Anchorage Devices: Type recommended by manufacturer, [exposed to view] [concealed].

G. Sealant and Backing Materials: As specified in Section 07900 of types described below.
   1. Perimeter Sealant: Polyurethane type.
   2. Sealant Used Within System (Not Used for Glazing): Silicone type.
   3. Structural silicone sealant performance requirements:
      a. Hardness: ASTM D2240, Type A, 30 durometer.
      b. Ultimate Tensile Strength: ASTM D412, 170 psi.
      c. Tensile at 150% Elongation: ASTM D412, 80 psi.
      d. Joint Movement Capability After 14-Day Cure: ASTM C719, +/- 50%.
   4. Peel Strength (Aluminum, Glass, Concrete) After 21-Day Cure: ASTM C794, 32 lb./in.
      a. Protective Back Coating: Asphaltic mastic, ASTM D4479/D4479M, Type I.

2.5 FABRICATION

A. Verify field measurements prior to fabrication.

B. Rigidly fit and secure joints and corners with screw and spline; fabricate rigid joints with connections that are flush, hairline, and weatherproof.

C. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.

D. Drain to exterior any water entering exterior joints, condensation occurring in glazing channels, or migrating moisture occurring within system.

E. Prepare components to receive concealed anchorage devices, and ensure that fasteners will be concealed upon completion of installation.

2.6 FACTORY FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.

B. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system; interior surfaces only.

C. Color: To be selected by Architect from manufacturer's standard range.

D. Concealed Steel Items: Galvanized in accordance with ASTM A123 to 2.0 oz/sq ft. Primed with red oxide paint.

E. Apply 1 coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

2.7 ACCESSORIES

A. Safety Screen System: See Section 07 72 00 for additional information.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that structural curb is ready to receive skylight system. Coordinate installation of roofing and other adjacent work to ensure weathertight construction.

3.2 PREPARATION

A. Apply single coat of protective coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

3.3 INSTALLATION

A. Install metal-framed skylights in accordance with manufacturer's instructions.

B. Set skylight structure plumb, level, and true to line, without warp or rack of frames or glazing panels. Anchor securely in place in accordance with approved shop drawings.

C. Provide alignment attachments, shims, and anchors required to permanently fasten skylight system to building structure.

D. Method of attachment to structure to permit sufficient adjustment to accommodate construction tolerances and irregularities

E. Maintain assembly dimensional tolerances, aligning with adjacent work.

F. Install base flashings in accordance with Section 07 62 00.

G. Attach and seal to adjacent air and vapor barrier materials

H. Pack fibrous insulation in shim spaces at perimeter of assembly to ensure continuity of thermal barrier.

I. Install glazing in accordance with Section 08 80 00.

J. Touch up damaged finishes so repair is imperceptible from 6 feet distance, and remove and replace components that cannot be acceptably touched up.

3.4 TOLERANCES

A. Maximum Variation from Plumb, Level, or Line: 1/8 inch per 10 feet, or 1/4 inch total in 100 feet, whichever is less.

B. Alignment of Two Adjoining Members Abutting in Plane: Within 1/32 inches.

3.5 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general testing and inspection requirements.

B. Test installed skylight for water leakage in accordance with AAMA 501.2. Retest until passing.

C. Repair or replace metal-framed skylight components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.6 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Wash down exposed surfaces; wipe surfaces clean.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section references specification sections relating to commercial door hardware for the following:

1. Swinging doors.
2. Sliding Doors.
3. Other doors to the extent indicated.

B. Commercial door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical and access control door hardware.
3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
4. Automatic operators.
5. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware”.
2. Division 26 Section “Electrical”.
3. Division 28 Section “Access Control”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.

1. Section 08 71 00 – Door Hardware.

C. Manufacturer’s Abbreviations:

1. PE - Pemko
2. RO - Rockwood
3. SA - SARGENT
4. MC - Medeco
5. RF - Rixson
6. OT - Other
7. MK - McKinney
8. SU - Securitron

Hardware Sets

Set: 1.0

Doors: 158-1, 159-1, 160-1

2 Continuous Hinge	CFM_HD1		PE	087100
1 Removable Mullion	L980A	US28	SA	087100
1 Rim Exit Device, Exit Only	43 8810 EO	US32D	SA	087100
1 Rim Exit Device, Storeroom	LD 43 70 8804 862	US32D	SA	087100
1 Cylinder	70 980C1	US26D	SA	087100
2 Small Format Inter Core	Coordinate with existing	26	MC	087100
2 Door Closer	281 CPS	EN	SA	087100
2 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1 Threshold	to architect detail		PE	087100
2 Door Seals	Integral part of door		OT	
2 Door Contact	By Security		OT	
1 Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: Operation:
*Door position switch to monitor status of opening.

Set: 2.0

Doors: 151-1

1 Continuous Hinge	CFM_HD1		PE	087100
1 Rim Exit Device, Storeroom	LD 43 70 8804 862	US32D	SA	087100
1 Cylinder	70 980C1	US26D	SA	087100
1 Small Format Inter Core	Coordinate with existing	26	MC	087100
1 Door Closer	281 CPS	EN	SA	087100
1 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1 Threshold	to architect detail		PE	087100
1 Door Seals	Integral part of door		OT	
1 Door Contact	By Security		OT	
1 Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: Operation: *Door position switch to monitor status of opening.

Set: 3.0

Doors: V104-1, V105-1

2	Continuous Hinge	CFM_HD1 EL-CEPTx32D		PE	087100
1	Removable Mullion	L980A	US28	SA	087100
1	Rim Exit Device, Storeroom	LD 43 55 56 70 8804 862	US32D	SA	087100
1	Rim Exit Device, Exit Only	43 55 8810 862	US32D	SA	087100
1	Cylinder	70 980C1	US26D	SA	087100
2	Small Format Inter Core	Coordinate with existing	26	MC	087100
2	Door Closer	281 CPS	EN	SA	087100
1	Threshold	to architect detail		PE	087100
2	Door Seals	Integral part of door		OT	
2	ElectroLynx Harness - Frame	QC-C1500P		MK	087100
2	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100
1	Card Reader	By Security			
1	Power Supply	AQL x Amperage as required		SU	087100
2	Door Contact	By Security		OT	
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: Operation: Door normally closed and secured. Upon use of mechanical key or presentation of authorized credentials latch to retract allowing authorized entry. Built in request to exit switch to allow authorized egress. Door position switches to monitor status of door. Upon loss of power door to remain locked. Always free egress.

Set: 4.0

Doors: 185G-1, C201, C202-1, C203-1, C204-1, S206-1

2	Continuous Hinge	CFM_HD1		PE	087100
2	Surface Vert Rod Exit, Classroom	12 43 70 NB8743 ETL	US32D	SA	087100
2	Small Format Inter Core	Coordinate with existing	26	MC	087100
2	Door Closer	281 UO	EN	SA	087100
2	Kick Plate	K1050 8" high CSK BEV	US32D	RO	087100
2	Electromagnetic Holder	998M	689	RF	087100
1	Gasketing	S88D (Head & Jambs)		PE	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: TIE ELECTROMAGNETIC HOLDERS INTO FIRE ALARM SYSTEM. UPON ACTIVATION POWER IS REMOVED AND DOORS SHUT.

Set: 5.0

Doors: C202, C203

2	Continuous Hinge	CFM_HD1		PE	087100
2	Surface Vert Rod Exit, Passage	12 NB8715 ETL	US32D	SA	087100
2	Door Closer	281 UO	EN	SA	087100
2	Kick Plate	K1050 8" high CSK BEV	US32D	RO	087100
2	Electromagnetic Holder	998M	689	RF	087100
1	Gasketing	S88D (Head & Jambs)		PE	087100

Set: 6.0

Doors: 91D-1

2 Continuous Hinge	CFM_HD1		PE	087100
1 Removable Mullion	L980A	US28	SA	087100
1 Rim Exit Device, Exit Only	43 8810 EO	US32D	SA	087100
1 Rim Exit Device, Classroom	LD 43 70 8813 ETL	US32D	SA	087100
1 Cylinder	70 980C1	US26D	SA	087100
2 Small Format Inter Core	Coordinate with existing	26	MC	087100
2 Door Closer	281 CPS	EN	SA	087100
2 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1 Gasketing	S88D (Head & Jambs)		PE	087100

Set:7.0

Doors: 120-1, 121-1, 161-1, 162-1

1 Continuous Hinge	CFM_HD1		PE	087100
1 Classroom Lock	70 10XG37 LL	US26D	SA	087100
1 Small Format Inter Core	Coordinate with existing	26	MC	087100
1 Door Closer	281 UO	EN	SA	087100
1 Kick Plate	K1050 8" high CSK BEV	US32D	RO	087100
1 Electromagnetic Holder	998M	689	RF	087100
1 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1 Gasketing	S88D (Head & Jambs)		PE	087100

Set: 8.0

Doors: 91A-1

1 Continuous Hinge	CFM_HD1		PE	087100
1 Rim Exit Device, Classroom	LD 43 70 8813 ETL	US32D	SA	087100
1 Small Format Inter Core	Coordinate with existing	26	MC	087100
1 Door Closer	281 CPS	EN	SA	087100
1 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1 Gasketing	S88D (Head & Jambs)		PE	087100

Set: 9.0

Doors: 103-1, 185A-1, 187-1, 188-1, 220-1, 221-1, 272-1, 273-1, 291-1. 291-4

1 Continuous Hinge	CFM_HD1		PE	087100
1 Classroom Lock	70 10XG37 LL	US26D	SA	087100
1 Small Format Inter Core	Coordinate with existing	26	MC	087100
1 Door Closer	281 UO	EN	SA	087100
1 Kick Plate	K1050 8" high CSK BEV	US32D	RO	087100
1 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1 Gasketing	S88D (Head & Jambs)		PE	087100

Set: 10.0

Doors: 103D-1

1 Continuous Hinge	CFM_HD1		PE	087100
1 Passage Lock	70 10XU15 LL	US26D	SA	087100
1 Kick Plate	K1050 8" high CSK BEV	US32D	RO	087100
1 Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3 Silencer	608		RO	087100

Set: 11.0

Doors: 100-1, 160B-1

2 Continuous Hinge	CFM_HD1		PE	087100
1 Flush Bolt	2845	US26D	RO	087100
1 Storeroom/Closet Lock	70 10XG04 LL	US26D	SA	087100
1 Small Format Inter Core	Coordinate with existing	26	MC	087100
1 Surf Overhead Stop	9-X36	630	RF	087100
1 Door Closer	281 CPS	EN	SA	087100
1 Threshold	to architect detail		PE	087100
1 Rain Guard	346C TKSP		PE	087100
2 Sweep	3452CPK TKSP		PE	087100
1 Astragal	357SP 84" TKSP		PE	087100

END OF SECTION
08 71 00

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds.

1.2 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.

B. Section 08 14 16 - Flush Wood Doors: Glazed lites in non-rated doors.

C. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

D. Section 08 51 13 - Aluminum Windows: Glazing provided by window manufacturer.

E. Section 08 81 00 - Fire Rated Glass: Glazing in protective openings and assemblies.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).

E. ASTM C1036 - Standard Specification for Flat Glass; 2016.

F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.

H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

J. ASTM F1233 - Standard Test Method for Security Glazing Materials And Systems; 2008 (Reapproved 2019).

K. GANA (GM) - GANA Glazing Manual; 2008.

L. GANA (SM) - GANA Sealant Manual; 2008.

M. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.

N. IGMA TB-3001 - Guidelines for Sloped Glazing; 2001.

O. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).

P. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.

Q. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).

R. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.

S. UL 972 - Standard for Burglary Resisting Glazing Material; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 10 by 10 inch in size of glass units, showing coloration and design.

E. Certificate: Certify that sealed insulated glazing units meet or exceed specified requirements.
   1. Submit NFRC 100- CMA Bid Report for the project showing compliance with the project thermal requirements at time of initial submission. Bid report shall be based on NFRC test sizes utilizing project specific glazing.

F. Installer's Certificate: Certify that glass furnished without identification label is installed in accordance with Construction documents and applicable code.

G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.7 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

C. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Float Glass Manufacturers:
1. Guardian Industries Corp: www.sunguardglass.com.
2. Pilkington North America Inc: www.pilkington.com/na.
3. Solar Seal Company; www.solarseal.com.
4. Vitro Architectural Glass: www.vitroglazings.com

B. Laminated Glass Manufacturers:
1. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com.
2. Oldcastle Building Envelope: www.obe.com.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Design Pressure: In accordance with ASCE 7.
a. Positive Design Pressure: 20 psf.
b. Negative Design Pressure: 20 psf.
2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
5. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
1. In conjunction with weather barrier related materials described in other sections, as follows:
2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:

1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.3 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
   2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
   3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
   4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
   5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Heat-Strengthened float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

C. Laminated Glass which is also specified as Security Glass shall comply with UL 972 and ASTM F1233, Class 1.3.
   1. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum, or as required to meet specified standards.

2.4 INSULATING GLASS UNITS

A. Manufacturers:
   1. Glass: Any of the manufacturers specified for float glass.

B. Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Metal-Edge Spacers: Aluminum, bent and soldered corners.
   3. Spacer Color: Black.
   4. Edge Seal:
      a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
      b. Color: Black.
   5. Purge interpane space with dry air, hermetically sealed.

C. Type IG-A - Insulating Glass Units: Vision glass, double glazed.
   1. Applications: Exterior glazing unless otherwise indicated.
   2. Space between lites filled with argon.
   3. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
      a. Tint: Bronze.
   4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
      b. Coating: Solarban 70 Low-E film, on #3 surface.
   5. Total Thickness: 1 inch.
   6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
   7. Visible Light Transmittance (VLT): 60 percent, nominal.
   8. Solar Heat Gain Coefficient (SHGC): 0.38 percent, nominal.
   9. Glazing Method: Dry glazing method, tape and gasket spline.

D. Type IG-B - Insulating Glass Units: Sloped glazing, laminated; IGMA TB-3001.

1. Applications: Exterior sloped glazing at 15 degrees or more from vertical, unless otherwise indicated.
2. Space between lites filled with air.
3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
4. Laminated Inboard Lite, Outer Pane: Annealed float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
5. Laminated Inboard Lite, Inner Pane: Annealed float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
6. Total Thickness: 1 inch.
7. Thermal Transmittance (U-Value), Winter - Center of Glass:.024, nominal.

E. Type IG-C - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
   a. Tint: Bronze.
4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
   a. Coating: Velour Etch, on #3 surface.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
7. Visible Light Transmittance (VLT): 60 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.38 percent, nominal.
9. Glazing Method: Dry glazing method, tape and gasket spline.

F. Type IG-D - - Insulating Glass Units: Security glazing; ASTM F1233, Class 1.3; UL 972.
1. Applications:
   a. Glazed lites in exterior doors and interior vestibule doors.
   b. Glazed sidelights and panels next to exterior doors and interior vestibule doors.
2. Space between lites filled with argon.
3. Outboard Lite: Fully Tempered Safety Glass, 1/4 inch thick,, minimum.
   a. Tint: Bronze.
   b. Coating: Low-E (passive type), on #2 surface.
4. Laminated Inboard Lite: Glass Clad Polycarbonate
   a. Glass: Inner and Outer panes shall be Fully tempered float glass.
   b. Interlayer: Polyvinyl butyral (PVB); .030" minimum, or thickness as required
   c. Overall Nominal Thickness: 3/8 inch thick, minimum.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.23, nominal.
7. Visible Light Transmittance (VLT): 59 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.27 percent, nominal.
9. Glazing Method: Dry glazing method, tape and gasket spline.

G. Type IG-E - Insulating Glass Units: Spandrel glazing.
1. Applications: Exterior spandrel glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
   a. Tint: Bronze.
   b. Coating: Same as on vision units, on #2 surface.
4. Inboard Lite: Fully tempered float glass, 1/4 inch thick.
   a. Tint: Clear.
   b. Opacifier: Ceramic frit, on #3 surface.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.23, nominal.

2.5 GLAZING UNITS

A. Type G-1 - Monolithic Interior Vision Glazing:
   1. Applications: Interior glazing unless otherwise indicated.
   2. Glass Type: Annealed float glass.
   3. Tint: Clear.
   4. Thickness: 1/4 inch, nominal.

2.6 ACCESSORIES

A. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color to match frame.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

D. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

E. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.4 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

F. Carefully trim protruding tape with knife.

3.5 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

C. Monitor and report installation procedures and unacceptable conditions.

3.6 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.7 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 81 00
FIRE RATED GLASS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire rated and safety rated glass for installation in steel frames and vision panels for fire rated doors.

B. Fire-rated/temperature-rise glass and framing system.

1.2 RELATED SECTIONS:

A. Section 07 92 00 - Joint Sealants: Sealant and back-up materials.

B. Section 08 14 16 - Flush Wood Doors: Glazed lites in fire rated doors.

C. Section 08 71 00 – Door Hardware.

D. Section 08 80 00 - Glazing.

1.3 REFERENCES

A. ANSI Z97.1 - American National Standard for Safety Glazing Materials used in Buildings - Safety Glazing Specifications and Methods of Test.

B. ASTM E119 - Standard Test Method for Fire Tests of Building Construction and Materials.

C. GANA - FGMA Sealant Manual.

D. GANA - Glazing Manual.

E. GANA PCR for Flat Glass: UN CPC 3711 Product Category Rule for Environmental Product Declarations.

F. NFPA 80 - Standard for Fire Doors, Fire Windows.

G. NFPA 251 - Fire Test for Fire Endurance of Building Construction and Materials.

H. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

I. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.

J. UL 9 - Fire Tests of Window Assemblies

K. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

L. UL 10B – Fire Tests of Window Assemblies.

M. UL 263 - Fire Resistance Ratings

N. CPSC 16 CFR, Part 1201 - Consumer Product Safety Standard - Safety Standard for Architectural Glazing.

1.4 SUBMITTALS

A. Section 01 30 00 - Administrative Requirements, for Submittal procedures.

B. Shop Drawings: Show dimensioned plans, elevations and details for doors, frames, and hardware components as shown on drawings and schedules. Provide templates for the location of embeds and anchor locations required any adjoining work.

C. Product Data: Submit latest edition of manufacturer’s product data providing product descriptions, technical data and installation instructions.

D. Samples:
1. Provide12-inch square samples for each type glass specified.
2. Provide manufacturer's color charts showing full range of powder coating colors for framing.

E. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

F. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials bearing manufacturer’s permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

G. Product Test Listings: From UL indicating fire-rated glass complies with requirements, based on comprehensive testing of current product.

H. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum ten years of documented experience.

B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

D. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252, ASTM E119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.

E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to ASTM E119 and NFPA 257.
1. Window assemblies with ratings of less than 60 minutes may be tested in accordance with ASTM E2010-01, NFPA 257, UBC 7-4, UL 9, CAN4-S106 Standard Test Methods.

F. Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
1. Door assemblies shall be tested to the acceptance criteria of ASTM E2074-00, NFPA 252, UL 9, UL 10-C Standard Methods of Fire Tests of Door Assemblies.

2. Window assemblies shall be tested to the acceptance criteria of ASTM E2010-01, NFPA 257, UL 10-B, UL 10-C Standard methods for Fire Tests of Window Assemblies.
3. Wall assemblies shall be tested to the acceptance criteria of ASTM E119, NFPA 251, UL 263 Standard Test Methods for Fire Tests of Building Construction and Materials.
4. An approved independent testing laboratory equal to UL shall conduct fire test

G. Listings and Labels -Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer's listing.

H. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.

I. Door assemblies shall be marked with the hourly rating followed by the letter "S". The letter "S" indicates air leakage resistance testing conformance to UBC 7-2 Parts I and II.

J. Regulatory Requirements: Comply with provisions of the following:
1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," and ANSI A117.1 as follows:
2. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
3. Door Closers: Comply with the following maximum opening-force requirements indicated:
4. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

1.6 PRE-INSTALLATION MEETING

A. Section 01 30 00 - Administrative Requirements: Preinstallation meeting.

B. Convene minimum one week before starting Work of this section.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle under provisions specified by manufacturer. For details on storage and product handling, please contact Manufacturer and request information on storage and product handling.

B. Deliver materials to specified destination in manufacturer or distributor's packaging undamaged, complete with installation instructions.

C. Store off ground, under cover, protected from weather and construction activities.

D. Do not expose fire rated glass to temperatures greater than 120 degrees or less than minimum 40 Degrees F during storage and transportation.

E. Do not expose the non-PVB side of glass to UV light.

F. Store sheets of glass vertically. DO NOT lean.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Provide the Manufacturer's limited five year warranty from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 FIRE RATED GLASS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following manufacturers:
   1. Vetrotech Saint Gobain North America Inc; www.vetrotech.com.
   2. Safti First; www.safti.com.
   3. Substitutions: Section 01 60 00 - Product Requirements.

B. Fire Rated Glazing Type FRG -1:
   1. Basis of Design: PyroEdge as manufactured by VAGC Glass Company.
   2. Wireless, optically clear tempered glazing material for use in impact safety rated 20-min.doorlite applications. Provides smoke and flame barrier. Does not provide a barrier to radiant or conductive heat.
   3. Properties:
      a. Fire Rating Testing: Fire rating tested and listed by Underwriters Laboratories; tested in accordance with NFPA 252, UL 9, UL 10C and ASTM E 2074 (without hose stream test).
         1) Fire Rating: 20 minutes (without hose stream test) for door lites.
      b. Thickness: 1/4 inch (6mm).
      c. Weight: 3.2 lbs/sf (16 kg per sq. meter).
      d. Approximate Visible Light Transmission: 90 percent.
      e. Impact Safety Performance: ANSI Z97.1 and CPSC 16CFR1201 (CAT I & II).
   4. Labeling: Each piece of fire-rated glazing shall be permanently labeled with the Manufacturer's, Warnock Hersey, and/or, Underwriters Laboratories' Logos on sizes up to 3325 sq. inches. Label is also to include name of product, fire rating period, safety glazing standards, and date of manufacture.
   5. Framing System: Standard fire rated doors.

C. Fire Rated Glazing Type FRG -2:
   1. Basis of Design: Keralite Standard Laminated (L) as manufactured by Vetrotech Saint Gobain
   2. Fire and impact safety-rated laminated glazing material for use in fire rated door, window, transom and borrowed lite assemblies.
   3. Properties:
      a. Thickness: 5/16 inch (8 mm).
      b. Weight: 4.5 lbs./sq. ft.
      c. Approximate Visible Transmission: 80 percent.
      d. Fire-ratings, tested and listed by Underwriters Laboratories; tested in accordance with UL 9, UL 10c, NFPA 252, NFPA 257, ASTM E 2010, and ASTM 2074, as indicated on drawings:
         1) Fire Rating: 20 minutes (with hose stream test) for doors, windows, sidelites, transoms and borrowed lites.
         2) Fire Rating: 45 minutes (with hose stream test) for doors, windows, sidelites, transoms and borrowed lites.
         3) Fire Rating: 60 minutes (with hose stream test) for doors, windows, sidelites and transoms.
         4) Fire Rating: 90 minutes (with hose stream test) for doors, windows, sidelites and transoms
      e. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).

4. Labeling: Each piece of fire-rated glazing shall be permanently labeled with the Manufacturer's, Warnock Hersey, and/or, Underwriters Laboratories' Logos on sizes up to 3325 sq. inches. Label is also to include name of product, fire rating period, safety glazing standards, and date of manufacture.
5. Framing System: Standard fire rated doors and frames as specified.

2.2 FIRE RATED FRAMING SYSTEM

A. System Includes Fire Rated Glass and Framing System:
   1. Glass Product: PYROSTOP; clear, fire and safety rated glazing.
   2. Frame Product: FIREFRAMES; Fire Rated Steel Door & Framing System. Frame profiles supplied and distributed by TGP.

B. Performance Options/Requirements:
   1. Fire Rating: 60-120-minutes as indicated on drawings.
   2. Certification: System tested in accordance with ASTM E-119, NFPA 251, UBC 7-1, UL 263. Temperature on the non-fire side of the system at the conclusion of fire test shall not be more than 250 degree F above the initial ambient room temperature.
   3. Listing / Label: Fire Testing shall be conducted by an approved independent test laboratory similar to Underwriters Laboratories, Inc. (UL).

C. Materials:
   1. Steel Frame: Profiled steel tubing permanently joined with steel bolts.
   2. Insulation: Insulate framing system against effects of fire, smoke, and heat transfer from either side. Insulate profiled steel tubing using a shell construction that incorporates PROMATECT intermediate interlayer. Firmly pack perimeter of framing system to rough opening with mineral wool fire stop insulation or appropriately rated intumescent sealant.
   3. Steel Glazing Beads: rolled steel beads with dimensions recommended by manufacturer to securely hold glazing material in place.
   4. Fasteners: Type recommended by manufacturer.
   5. Glazing Accessories: Set PYROSTOP glass using calcium silicate or neoprene setting blocks.
   6. Finish: Powder coated, color as selected by Architect.

2.3 ACCESSORIES

A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.

B. Glazing Compound: DAP 33 putty.

C. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:
   1. Dow Corning 795 - Dow Corning Corp.
   2. Silglaze-II 2800 - General Electric Co.
   3. Spectrem 2 - Tremco Inc.

D. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

E. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.4 FABRICATION

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirement.

B. Fabrication Dimensions: Fabricate fire rated assembly to approved dimensions. Guarantee dimensions where practicable within required tolerance.

C. Framing System: Furnish frame assemblies pre-welded.
   1. Field splice frames too large for shop fabrication or shipping or to fit in available building openings.
   2. Fit with manufacturer approved fasteners.
   3. Knock-down door perimeter frames are not permitted.

D. Fabrication Dimensions: Fabricate fire rated assembly to dimensions verified in field.

E. Obtain approved Shop Drawings prior to fabrication.

2.5 FINISHES

A. Comply with NAAMM's (National Association of Architectural Metal Manufacturers) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish frames after assembly.

C. Protect finishes on exposed surfaces from damage by applying a removable, temporary protective cladding before shipping.

D. Appearance of Finished Work: Variations in appearance of adjacent frame sections are acceptable. Noticeable variations in the same piece are not acceptable.

E. Color-Coated Finish: Apply manufacturer's standard powder coating finish system complying with AAMA 2603 applied to factory-assembled frames before shipping, complying with manufacturer's written instructions for surface preparation including pretreatment, application, and minimum dry film thickness.
   1. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify openings for glazing are correctly sized and within acceptable tolerance.

C. Examine glass framing, with glazier present, for compliance with the following.
   1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
   2. Minimum required face or edge clearances.
   3. Observable edge damage or face imperfections.

D. Do not proceed with glazing until unsatisfactory conditions have been corrected.

E. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealant in accordance with manufacturer’s instructions.

3.3 INSTALLATION

A. Perform installation in accordance with GANA Glazing Manual.
   1. Glazing Sealants: Comply with FGMA and ASTM C1193.
   2. Fire Rated Openings: Comply with NFPA 80.

B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.

C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.

E. Place setting blocks located at quarter points of glass with edge block no more than 6 inches from corners.

F. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

G. Place glazing tape on free perimeter of glazing in same manner described above.

H. Install removable stop and secure without displacement of tape.

I. Install in vision panels in fire-rated doors to requirements of NFPA 80.

J. Install so that appropriate UL markings remain permanently visible.

3.4 PROTECTION AND CLEANING

A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels, and clean surfaces.
   1. Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.
   2. Bullet resistant glazing materials with sensitive protect surface applied film on exterior surface. Do not use any of the following:
      a. Steam jets.
      b. Abrasives.
      c. Strong acidic or alkaline detergents, or surface-reactive agents.
      d. Detergents not recommended by manufacturer.
      e. Detergent above 77 degrees F (25 degrees C).
      f. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
      g. Metal or hard parts of cleaning equipment must not touch the glass surface.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do

come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.5 REPAIR AND TOUCH UP

A. Limited to minor repair of small scratches. Use only manufacturer's recommended products.
   1. Such repairs shall match original finish for quality or material and view.
   2. Repairs and touch-up not visible from a distance of 5 feet (1.5 m). Owner and Architect to approve.

B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged

END OF SECTION

SECTION 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. Resilient tile and sheet.
   2. Carpet tile.
   3. Thin-set ceramic tile and stone tile.
   4. Resinous Matrix Terrazzo & TerrazzoTreads.

B. Removal of existing floor coverings.

C. Preparation of existing concrete floor slabs for installation of floor coverings.

D. Testing of concrete floor slabs for moisture and alkalinity (pH).

E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
   1. Contractor shall include, in base bid, specified remediation work of all interior concrete floor slabs receiving floor coverings outlined below.
   2. Remedial Floor Coating to include in base bid at:
      a. Existing concrete slabs receiving adhesively applied flooring.
   3. Remedial Floor Coating not included in base bid at:
      a. Existing concrete slabs receiving thin-set applied flooring, including but not limited to ceramic, quarry, and stone tile.
   4. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

F. Patching compound.

G. Remedial floor coatings.

H. Remedial floor treatment.

1.2 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.

B. Section 01 74 19 - Construction Waste Management and Disposal: Handling of existing floor coverings removed.

C. Section 03 30 00 - Cast-in-Place Concrete: Concrete admixture for slabs to receive adhered flooring, to prevent moisture content-related flooring failures.

D. Section 03 30 00 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.

E. Section 03 54 00 - Cast Underlayment: Self-leveling underlayment applied as remediation treatment.

1.3 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2019.

E. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.

F. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2018.

G. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Visual Observation Report: For existing floor coverings to be removed.

C. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and alkalinity (pH) limits and test methods.
   2. Manufacturer's required bond/compatibility test procedure.

D. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
   1. Manufacturer's qualification statement.
   2. Manufacturer's statement of compatibility with types of flooring applied over remedial product.
   3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
   4. Manufacturer's installation instructions.
   5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

E. Testing Agency's Report:
   1. Description of areas tested; include marked up floor finish plans and photographs if helpful.
   2. Summary of conditions encountered.
   3. Moisture and alkalinity (pH) test reports.
   4. Copies of specified test methods.
   5. Recommendations for remediation of unsatisfactory surfaces.
   6. Product data for recommended remedial coating.
   7. Certificate: Include certification of accuracy by authorized official of testing agency.
   8. Submit report to Architect.
   9. Submit report not more than two business days after conclusion of testing.

F. Adhesive Bond and Compatibility Test Report.

G. Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.

H. Copy of RFCI (RWP).

1.5 PERFORMANCE REQUIREMENTS

A. Manufacturer must provide Independent lab test reports documenting performance per the following:
   1. ASTM E 96, Water Vapor Transmission (wet method) Performance shall be documented by an independent testing laboratory at a minimum of 97% water vapor transmission reduction compared to untreated concrete.
   2. ASTM E96- Perm Rating - Standard Test Method for Water Vapor Transmission of Materials – Perm Rate results must not exceed 0.1 Perms.
   3. ASTM D 1308; Insensitivity to alkaline environment up to, and including, pH 14. A 14 day test is required with no degradation of sample reported.
   4. Certify acceptance and exposure to continuous topical water exposure after final cure.

1.6 QUALITY ASSURANCE

A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.

B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
   1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
   2. Acceptable Testing Agencies:
      a. Independent Floor Testing & Inspection, Inc. (IFTI): www.ifti.com/#sle.
      b. Substitutions: Not permitted.

C. Contractor's Responsibility Relating to Independent Agency Testing:
   1. Provide access for and cooperate with testing agency.
   2. Confirm date of start of testing at least 10 days prior to actual start.
   3. Allow at least 4 business days on site for testing agency activities.
   4. Achieve and maintain specified ambient conditions.
   5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

D. Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.

E. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s instructions and recommendations.

B. Deliver materials in manufacturer’s packaging; include installation instructions.

C. Keep materials from freezing.

1.8 FIELD CONDITIONS

A. Only conduct calcium chloride tests at the same temperature and humidity expected during normal use, maintained 48 hours prior to and during testing. If this is not possible, use the following guidelines:

B. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.

C. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.1 MATERIALS

A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
   1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
   2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
   3. Products:
      a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com
      b. H.B. Fuller Construction Products, Inc; TEC Feather Edge Skim Coat: www.tecspecialty.com/#sle.
      c. CMP Specialty Products; Prepstar: www.cmpsp.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

C. Remedial Floor Coating: Single-layer epoxy based coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
   1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
   2. Water Vapor reduction system shall be a single coat, stand alone system with no requirements for additional components such as sand broadcast for adhesion of flooring systems.
   3. System must reduce Calcium Chloride readings of up to 25lbs/1000 ft2/24 hrs by 97% in one coat. System must be able to perform as required with RH Probe readings of 100%.
   4. Products:
      a. ARDEX Engineered Cements; ARDEX MC RAPID: www.ardexamericas.com/#sle.
      b. CMP Specialty Products; Lockdown: www.cmpsp.com.
      c. H.B. Fuller Construction Products, Inc; TEC LiquiDam with TEC Level Set 200 SLU: www.tecspecialty.com/#sle.
      d. Or as approved by manufacturer of flooring system.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
      a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
      b. Removal of existing floor covering.
   2. Preliminary cleaning.
   3. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
   4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   6. Specified remediation, if required.
   7. Specified remediation, required under all resilient flooring associated with this project.
   8. Patching, smoothing, and leveling, as required.
   9. Other preparation specified.
   10. Adhesive bond and compatibility test.
   11. Protection.

B. Remediations:
   1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
   2. Apply remedial floor coating under all flooring related to this project.
   3. Excessive Moisture Emission or Relative Humidity: Apply remedial floor coating over entire suspect floor area.
   4. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

C. Patching
   1. In areas of wall demolition at terrazzo or locker base at tile flooring scheduled to remain, patch removal area with specified patch material to match existing floor surface.
      a. Grind patched terrazzo surface for seamless surface in preparation for Owner applied floor finish.

3.2 REMOVAL OF EXISTING FLOOR COVERINGS

A. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.

B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.3 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

B. Do not use solvents or other chemicals for cleaning.

3.4 MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F1869 and as follows.

D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.

F. Report: Report the information required by the test method.

3.5 INTERNAL RELATIVE HUMIDITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F2170 Procedure A and as follows.

D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

F. Report: Report the information required by the test method.

3.6 ALKALINITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
   1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
   2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.

3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.

C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.7 PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with requirements and recommendations of floor covering manufacturer.

C. Clean all surfaces to receive moisture vapor reduction system. Shot blast all floors to a Concrete Surface Profile (CSP) #3 or #4 and clean surfaces with an industrial vacuum cleaner and remove all residues from the substrate. Grinding is allowed only in areas not accessible by shot blasting. Remove ALL defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, Shot blast bee bees, etc. Repair all cracks, expansion joints, control joints, and open surface honeycombs and fill in accordance with Manufacturer’s recommendations. If concrete additives such as chlorides or any other soluble compounds that may contaminate surfaces have been used in the concrete mix do not use this product on that floor without written approval from manufacturer. Reinforcing fibers that are visible after shot blasting must be removed and vacuumed leaving no fibers left on the concrete surfaces. Provide an uncontaminated, sound surface. DO NOT ACID ETCH!

D. Repair concrete prior to moisture vapor reduction system installation by using MVRS manufacturer's approved concrete repair materials. Comply with all requirements as listed in Manufacturer's technical data information. Consult with vapor reduction manufacturer.

E. Ensure surfaces to be treated with moisture vapor reduction system have NOT previously been treated with other materials such as underlayments, screeds, penetrating sealants, silicates, etc. If this is the case, consult with the Manufacturer’s Representative prior to any application of moisture vapor reduction system.

F. Shot blast a small test area and review surface profile with the finished flooring applicator.

G. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.

H. Do not fill expansion joints, isolation joints, or other moving joints.

3.8 ADHESIVE BOND AND COMPATIBILITY TESTING

A. The Owner's Special Inspector shall verify proper adhesion of flooring adhesives, coatings, and leveling compounds to the final vapor reduction coating system for acceptability. Contact Manufacturer's Representatives for recommendations.

B. Comply with requirements and recommendations of floor covering manufacturer.

3.9 APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

B. Allow to cure a minimum of 12 hours before installing flooring system.

3.10 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

B. Protect each coat during specified cure period from any kind of traffic, topical water and contaminants.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Acoustic insulation.

D. Cementitious backing board.

E. Gypsum wallboard.

F. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 07 21 00 - Thermal Insulation: Acoustic insulation.

C. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.

1.3 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016.

B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.

E. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).

F. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).

G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.

H. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

I. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2018.

J. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2019b.

K. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2018.

L. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.

M. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2019.

N. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

O. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.

P. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.

Q. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018.

R. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2019.

S. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

T. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019.

U. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

V. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

W. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

X. ASTM E413 - Classification for Rating Sound Insulation; 2016.

Y. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

Z. GA-224 - Installation of Predecorated Gypsum Board; Gypsum Association; 2008.

AA. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2016.

AB. GA-600 - Fire Resistance Design Manual; 2015.

AC. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate special details associated with fireproofing, acoustic seals, and deflection track.

C. Product Data: Provide data on metal framing, gypsum board, accessories, joint finishing system, and cementitious backer board.

D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

E. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.5 QUALITY ASSURANCE

A. Manufacturer: company specializing in manufacturing products specified in this section with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this section, with minimum ten years of documented experience.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire Rated Assemblies: Provide completed assemblies (Tested rating determined in accordance with ASTM119) with rating as indicated on drawings.
   1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.2 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. ClarkDietrich: www.clarkdietrich.com/#sle.
   2. Marino: www.marinoware.com/#sle.
   3. MBA Studs: www.mbastuds.com

B. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
   2. Studs: C-shaped with knurled or embossed faces.
   3. Minimum Base Metal Thickness: 18 mils; 0.018 inch, or as required to meet design or code requirements.
   4. Runners: U shaped, sized to match studs.
   5. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.

C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes and screws, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.

2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.
   a. Products:
      1) ClarkDietrich; MaxTrak Slotted Deflection Track: www.clarkdietrich.com/#sle.
      2) Marino; Slotted Track: www.marinoware.com/#sle.
      3) MBA Building Supplies; Slotted Slip Track: www.mbastuds.com/#sle.
      4) Substitutions: See Section 01 60 00 - Product Requirements.

2.3 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   3. National Gypsum Company: www.nationalgypsum.com/#sle.
   4. USG Corporation: www.usg.com/#sle.

A. Gypsum Wallboard - General
   1. All gypsum wallboard incorporated into the Work, whether indicated or not, shall comply with all of the following:
      a. Thickness: 5/8 inch.
      b. Core: Type X, UL or WH listed.
         1) Exception: Where Fire Resistance Rating requires Type C.
      c. Core and Face: Moisture and mold resistant, with a mold resistance score of 10, when tested in accordance with ASTM D3273.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
      a. Mold resistant board is required at all locations.
   4. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   5. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
      c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   6. Mold Resistant Paper Faced Products:
      a. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
      b. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: www.gpgypsum.com/#sle.
      c. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com/#sle.
      d. USG Corporation; USG Sheetrock Brand EcoSmart Panels Mold Tough Firecode X: www.usg.com/#sle.
   7. Glass Mat Faced Products:
      a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
      b. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel: www.nationalgypsum.com/#sle.
      c. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.

C. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
   1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Glass Mat Faced Products:
      a. CertainTeed Corporation; GlasRoc Shaftliner Type X: www.certainteed.com/#sle.
      b. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant): www.gpgypsum.com/#sle.
      c. National Gypsum Company; Gold Bond Brand eXP Shaftliner: www.nationalgypsum.com/#sle.
      d. USG Corporation; USG Sheetrock Brand Glass-Mat Liner Panels Mold Tough: www.usg.com/#sle.

2.4 GYPSUM WALLBOARD ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: To match wall depth.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, or rolled zinc, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
   3. Products:
      a. Same manufacturer as framing materials.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
   2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
   3. Joint Compound: Drying type, vinyl-based, ready-mixed.
   4. Joint Compound: Setting type, field-mixed.

E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
   1. Products:
      a. CertainTeed Corporation; Level V Wall and Ceiling Primer/Surfacer with M2Tech: www.certainteed.com/#sle.
      b. USG Corporation; USG Sheetrock Brand Tuff-Hide Primer-Surfacer: www.usg.com/#sle.

F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that project conditions are ready to receive work and opening dimensions are as indicated on shop drawings to commence.

3.2 EXISTING WORK

A. Extend existing gypsum board installations using materials and methods as specified.

B. Repair and remodel existing gypsum board assemblies which remain or are to be altered.

3.3 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
   1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
   2. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.

3.4 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging. Provide extended leg ceiling runners with compressible fire rated fill.

C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

D. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.

E. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.

F. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.

G. Blocking: Install wood blocking for support of:
   1. Wall-mounted cabinets.
   2. Plumbing fixtures.
   3. Toilet partitions.
   4. Toilet accessories.
   5. Wall-mounted door hardware.
   6. Wood frame opening.
   7. Or any other materials requiring blocking. Coordinate blocking requirements with other contractors.

3.5 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place two beads continuously on substrate before installation of perimeter framing members.
   2. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, rough-in boxes, and other equipment.. Do Not seal penetrations scheduled to receive firestopping.

3.6 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
   1. Use screws when fastening gypsum board to metal furring or framing.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Double-Layer Non-Rated:
   1. Use gypsum backing board for first layer, placed perpendicular to framing or furring members, with ends and edges occurring over firm bearing. [Use fire rated gypsum backing board for fire rated partitions and ceilings.]
   2. Place second layer parallel to framing or furring members.
   3. Offset joints of second layer from joints of first layer.
   4. Treat cut edges and holes in moisture resistant gypsum board with sealant.

D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
   1. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.

E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
   1. Seal joints, cut edges, and holes with water-resistant sealant.

G. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.

H. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.7 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart for exposed interior linear construction.
   2. Not more than 25 feet where ceramic wall tile is installed on an interior wall.
   3. Not more than 12 feet where ceramic wall tile is installed on an exterior wall, in direct sunlight or wet conditions.
   4. At metal door frames and windows above each jamb.
   5. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.8 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   2. Level 3: Walls to receive textured wall finish.
   3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   4. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
   5. Level 0: Temporary partitions.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.9 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Ceramic trim.

D. Non-ceramic trim.

1.2 RELATED REQUIREMENTS

A. Section 03 54 00 - Cast Underlayment.

B. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

C. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

1.3 REFERENCE STANDARDS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
   1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017.
   2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 2017.
   3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2016).
   4. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship; 2019.
   5. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
   6. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
   7. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
   8. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).
   9. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
   10. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2017.

11. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
12. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2016).
13. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2017.
14. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
15. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Reaffirmed 2016).
16. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation; 2014.
17. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014.
18. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.

C. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2012.

D. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018.

E. Current TCNA (HB) - Handbook for Cermaic, Glass and Stone Tile installation; 2022.
   1. Maintain 1 (one) copy of current TCNA Handbook on site.

F. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

G. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

H. Maintain 1 (one) copy of current TCNA Handbook on site.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

B. Pre-installation Meeting: Convene a pre-installation meeting one week before starting work of this section; require attendance by all affected installers – Review requirements in ANSI 108.01 for substrates and for preparation by other trades.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Samples: Submit two sets of samples of the following for color selection or verification of color and finish variations:
   1. Tile products.
   2. Threshold, trims, and accessories.
   3. Grouts.
   4. Sealants.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.

G. Installer's Qualification Statement:
   1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.
   2. Submit documentation of completion of apprenticeship and certification programs.

H. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Tile: 5 percent of each size, color, and surface finish combination, but not less than 2 of each type.

1.6 CLOSEOUT SUBMITTALS

A. See Section 01 70 00 - Execution and Closeout Requirements for closeout procedures.

1.7 QUALITY ASSURANCE

A. Maintain one copy of current ANSI A108/A118/A136 and current TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum ten years of documented experience.

C. Installer Qualifications:
   1. Company specializing in performing tile installation, with minimum of five years of documented experience.
      a. Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA).
   2. Installer Certification:
      a. Ceramic Tile Education Foundation (CTEF): Certified Tile Installer (CTI).
      b. Apprenticeship Program: Installer has achieved Journeyworker status through an apprenticeship from the International Union of Bricklayers and Allied Craftworkers (IUBAC) or a U.S. Department of Labor (DOL)-recognized program.
      c. Advanced Certifications for Tile Installers (ACT): Certification in the installation of membranes, mortar bed (mud) floors, mortar (mud) walls, shower receptors, large format tile, gauged porcelain tile/panels/slabs, and grouts.
      d. International Masonry Training and Education Foundation (IMTEF): Supervisor Certification Program (SCP).

D. Warranty: Installer of work contained in this Section to warrant installation for minimum of 1 year from date of completion for defects in workmanship.

1.8 MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.

B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
   1. Minimum size of mock-up is indicated on drawings.
   2. Approved mock-up may remain as part of work.

1.9 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 60 00 - Product Requirements for product storage and handling requirements.

B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

C. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

D. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

E. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

F. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

A. Do not install adhesives and grouts in an unventilated environment.

B. Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

C. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 PRODUCTS

2.1 TILE

A. Manufacturers:
   1. Crossville, Inc.: www.crosvilleinc.com
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. WT-3 Porcelain Wall Tile: ANSI A137.1, standard grade.
   1. Certification: Tile certified by the Porcelain Tile Certification Agency.
   2. Moisture Absorption: <.20 percent as tested in accordance with ASTM C373.
   3. Nominal Size: __6__by__24__ inch, nominal.
   4. Thickness: 5/16 inch.
   5. Face Size Variation: Calibrated.
   6. Edges: Square.
   7. Surface Finish: PO / Polished.
   8. Dynamic Coefficient of Friction Wet: 0.31 - 0.41
   9. Color(s): As indicated on drawings.
   10. Sealer: Tile must be sealed prior to grouting, per manufactuer's recommendations
   11. Products:
      a. Crossville Inc.; Retro Active 2.0 & Patterns: www.crossvilleinc.com. Tile Wholesalers, Alissa DeSalvo 585-260-3061 alissa@tilewholesalers.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. WT-1, WT-5 Porcelain Wall Tile: ANSI A137.1, standard grade.
   1. Certification: Tile certified by the Porcelain Tile Certification Agency.
   2. Moisture Absorption: <.20 percent as tested in accordance with ASTM C373.
   3. Nominal Size: __6__by__12__ inch, nominal.
   4. Thickness: 5/16 inch.
   5. Face Size Variation: Calibrated.
   6. Edges: Square.
   7. Surface Finish: PO / Polished.
   8. Dynamic Coefficient of Friction Wet: 0.31 - 0.41
   9. Color(s): As indicated on drawings.
   10. Sealer: Tile must be sealed prior to grouting, per manufactuer's recommendations
   11. Products:
      a. Crossville Inc.; Retro Active 2.0 & Patterns: www.crossvilleinc.com. Tile Wholesalers, Alissa DeSalvo 585-260-3061 alissa@tilewholesalers.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

D. WT-4 Porcelain Wall Tile: ANSI A137.1, standard grade.
   1. Certification: Tile certified by the Porcelain Tile Certification Agency.
   2. Moisture Absorption: <.20 percent as tested in accordance with ASTM C373.
   3. Nominal Size: __6__by__12__ inch, nominal.
   4. Thickness: 5/16 inch.
   5. Face Size Variation: Calibrated.
   6. Edges: Square.
   7. Surface Finish: PTN / Pattern.
   8. Dynamic Coefficient of Friction Wet: 0.42-0.52
   9. Color(s): As indicated on drawings.
   10. Products:
      a. Crossville Inc.; Retro Active 2.0 & Patterns: www.crossvilleinc.com. Tile Wholesalers, Alissa DeSalvo 585-260-3061 alissa@tilewholesalers.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

E. WT-2 Porcelain Wall Tile: ANSI A137.1, standard grade.
   1. Certification: Tile certified by the Porcelain Tile Certification Agency.
   2. Moisture Absorption: <.20 percent as tested in accordance with ASTM C373.
   3. Nominal Size: __12__by__24__ inch, nominal.
   4. Thickness: 5/16 inch.
   5. Face Size Variation: Calibrated.
   6. Edges: Square.
   7. Surface Finish: PO / Polished.
   8. Dynamic Coefficient of Friction Wet: 0.31 - 0.41
   9. Color(s): As indicated on drawings.
   10. Sealer: Tile must be sealed prior to grouting, per manufactuer's recommendations
   11. Products:
      a. Crossville Inc.; Retro Active 2.0 & Patterns: www.crossvilleinc.com. Tile Wholesalers, Alissa DeSalvo 585-260-3061 alissa@tilewholesalers.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

F. WT-6 Porcelain Wall Tile: ANSI A137.1, standard grade.
   1. Certification: Tile certified by the Porcelain Tile Certification Agency.
   2. Moisture Absorption: <.20 percent as tested in accordance with ASTM C373.
   3. Nominal Size: __4__by__12__ inch, nominal.
   4. Thickness: 5/16 inch.
   5. Face Size Variation: Calibrated.
   6. Edges: Square.
   7. Surface Finish: PO / Polished.
   8. Dynamic Coefficient of Friction Wet: 0.31 - 0.41
   9. Color(s): As indicated on drawings.

10. Sealer: Tile must be sealed prior to grouting, per manufactuer's recommendations
11. Products:
    a. Crossville Inc.; Retro Active 2.0 & Patterns: www.crossvilleinc.com. Tile Wholesalers, Alissa DeSalvo 585-260-3061 alissa@tilewholesalers.com.
    b. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TRIM AND ACCESSORIES

A. Ceramic Trim: Matching cove base ceramic shapes in sizes coordinated with field tile.
   1. Applications:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
      c. Floor to Wall Joints: Cove base.
   2. Manufacturers: Same as for tile.

B. Non-Ceramic Trim: Brushed stainless steel, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:
      a. Open edges of wall tile.
      b. Open edges of floor tile.
      c. Wall corners, outside and inside.
      d. Transition between floor finishes of different heights.
      e. Thresholds at door openings.
      f. Expansion and control joints, floor and wall.
      g. Floor to wall joints.
      h. Borders and other trim as indicated on drawings.
   2. Manufacturers:
      a. Schluter-Systems: www.schluter.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 WATERPROOFING/CRACK ISOLATION MEMBRANE

A. Cold applied, single component liquid, load bearing membrane: ANSI A118.10 & A118.12

B. Fluid-Applied Membrane: System consisting of a self-curing liquid rubber polymer.
   1. Products: Subject to compliance with requirements, provide the following:
      a. Laticrete International, Inc.; Laticrete Hydro Ban Waterproof Membrane.
      b. Or approved equal

2.4 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Bostik, Inc.; Hydroment Blacktop 90210.
      b. Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane.
      c. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.

2.5 SETTING MATERIALS

A. Provide setting and grout materials from same manufacturer.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

C. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

D. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

E. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
   1. Stone thresholds
   2. Waterproof membrane
   3. Crack isolation membrane
   4. Cementitious backer units
   5. Metal edge strips

F. Manufacturers:
   1. LATICRETE International, Inc: www.laticrete.com/#sle.
   2. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
   3. Custom Building Products: www.custombuildingproducts.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

G. Latex-Portland Cement Mortar Bond Coat: Meets or Exceeds, ANSI A118.4.
   1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
   2. Products:
      a. LATICRETE International, Inc; 4XLT www.laticrete.com/#sle.
      b. LATICRETE International, Inc; Tri-lite: www.laticrete.com/#sle.
      c. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com/#sle.
      d. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.

H. Improved Latex-Portland Cement Mortar Bond Coat: Meets or Exceeds, ANSI A118.15.
   1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
   2. Products:
      a. LATICRETE International, Inc; LATICRETE International, Inc; Tri-lite: www.laticrete.com/#sle.
      b. ARDEX Engineered Cements; S 28: www.ardexamericas.com/#sle.
      c. Custom Building Products; Complete Contact-LFT Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
      d. H.B. Fuller Construction Products, Inc; TEC 3N1 Performance Mortar: www.tecspecialty.com/#sle.

2.6 GROUTS

A. Provide setting and grout materials from same manufacturer.

B. Manufacturers:
   1. Basis of Design: LATICRETE International, Inc: www.laticrete.com/#sle.
   2. Bostik Inc: www.bostik-us.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

C. Premixed Polymer Modified Grout: Single component, stain resistant grout.
   1. Applications: Where indicated.

2. Color(s): As indicated on drawings.
3. Products:
   a. Basis of Design: LATICRETE International, Inc; SPECTRALOCK 1 Pre-Mixed Grout: www.laticrete.com/#sle.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.7 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
   1. Applications: Between tile and plumbing fixtures.
   2. Color(s): As scheduled Refer to Finish Key.
   3. Products:
      a. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Tile Sealer: Stain protection for polished porcelain tile tile.
   1. Polished tile must be sealed prior to grouting, per manufactuer's recommendations
   2. Products:
      a. Basis of Design: STONETECH, a division of LATICRETE international, Inc; STONETECH BulletProof Stone Sealer: www.laticrete.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Grout Release: Temporary, water-soluble pre-grout coating.
   1. Products:
      a. Custom Building Products; Aqua Mix Grout Release: www.custombuildingproducts.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.8 ACCESSORY MATERIALS

A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
   1. Crack Resistance: No failure at 1/8 inch gap, minimum.
   2. Fluid or Trowel Applied Type:
      a. Material: Synthetic rubber or Acrylic.
      b. Thickness: 20 mils, maximum.
      c. Products:
         1) LATICRETE International, Inc; Fracture Ban SC: www.laticrete.com/#sle.
         2) Substitutions: See Section 01 60 00 - Product Requirements.
   3. Peel-and-Stick Sheet Type:
      a. Material: Rubberized membrane laminated to reinforcing fabric.
      b. Thickness: 20 mils, maximum.

B. Waterproofing and Slab Crack IsolationMembrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
   1. Crack Resistance: No failure at 1/8 inch gap, minimum; comply with ANSI A118.12.
   2. Fluid or Trowel Applied Type:
      a. Material: Synthetic rubber.
      b. Thickness: 25 mils, minimum, dry film thickness.
      c. Products:
         1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
         2) Substitutions: See Section 01 60 00 - Product Requirements.

C. Backer Board: Cementitious type; See Section 09 21 16 - Gypsum Board Assemblies.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

D. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

E. Verify that sub-floor surfaces, in areas with floor drains, are pitched uniformly to drains at 1/4 inch per foot nominal if not indicated on the drawings.
   1. Exception: Where tile is installed in areas of previously removed floor covering, and the sub-floor does not meet the stated pitch, build up thinset during installation to provide a positive pitch to drains of 1/8" per foot, minimum in all directions.

3.2 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

E. Scarify existing glazed structural block prior to installation of wall tile.

F. Place thresholds and edge strips at exposed tile edges.

3.3 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19 , manufacturer's instructions, and current TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2" width is used.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
   1. Tile joint width shall be as recommended by manufacturer for the individual tile type indicated, however, tile joint shall be no less than 1/8 inch, unless otherwise noted.

E. Form internal angles square and external angles bullnosed.

F. Install ceramic accessories rigidly in prepared openings.

G. Maintain specified positive pitch to all floor drains in all directions.

H. Install non-ceramic trim in accordance with manufacturer's instructions.

I. Sound tile after setting. Replace hollow sounding units.

J. Control and Expansion Joints: All Control and Expansion Joints per current TCNA EJ-171.
   1. Keep control and expansion joints free of mortar, grout, and adhesive.
   2. Provide interior control joints in tiled surfaces at 20'-25' in each direction.
   3. Provide exterior control joints in tiled surfaces at 8'-12' in each direction.
   4. Provide interior control joints in tiled surfaces exposed to direct sunlight or moisture at 8' to 12' in each direction.
   5. Provide movement joints where tile work abuts restraining surfaces, including perimeter walls, dissimilar floors, curbs, columns, pipes, door and window frames and where changes occur in backing materials.
   6. Joints through tilework directly over structural joints must never be narrower than the structural joint.
   7. Apply sealant to joints.

K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

N. When installation requires varying tile thickness due to patterning, build up thinset so that the entire installation is flush.

O. Seal all sanded and unsanded grout, with the exception of epoxy grout, per grout manufacturer's installation instructions.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with current TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
   1. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

3.5 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with current TCNA (HB) Method W244, using membrane at toilet rooms.

B. Over gypsum wallboard on wood or metal studs install in accordance with current TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

C. Over interior concrete and masonry install in accordance with current TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat.

3.6 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.

B. Clean tile and grout surfaces per manufacturer's recommendations.

3.7 PROTECTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit traffic over finished floor surface for 4 days after installation.

C. Protect installed tile from damage due to subsequent construction until Date of Substantial Completion.

3.8 SCHEDULE

A. Refer to Finish Key and Schedules.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

C. Cloud Ceilings

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 31 00 - Steel Decking: Placement of special anchors or inserts for suspension system.

C. Section 07 21 00 - Thermal Insulation: Acoustical insulation.

D. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.

E. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

1.3 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.

C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.

D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

F. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2019.

G. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2017.

H. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.

I. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.

J. UL (FRD) - Fire Resistance Directory; Current Edition.

K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, mechanical and electrical items installed in the ceiling, and indicate method of suspension where interference exists. Submit shop drawings for all custom shapes, clouds, and ceiling formations illustrating understanding of architect's intent. Notify architect in writing of any conflicts or dimensional changes.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two samples 6 x 6 inch size illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 6 inches long, of suspension system main runner, cross runner, and perimeter molding.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Manufacturer's qualification statement.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing the work specified in this section with minimum five years documented experience.

C. Conform to CISCA requirements.

D. Fire Rated Floor Construction: Rating as indicated on Drawings.
   1. Tested Rating: Determined in accordance with ASTM E119.

E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

F. Single Source Responsibility: To obtain combined warranty for the suspension system and the acoustical panel, color match or ceiling panel and suspension system compatibility, all acoustical panel and suspension system components shall be produced and supplied by one manufacturer. Materials supplied by more than one manufacturer are not acceptable.

G. Requirements of regulatory agencies: Codes and regulations of authorities having jurisdiction.

H. Source quality control:
   1. Test reports: Manufacturer will provide test certification for minimum requirements as tested in accordance with applicable industry standards and/or to meet performance standards specified by various agencies.

2. Changes from system: System performance following any substitution of materials or change in assembly design must be certified by the manufacturer.
3. All ceiling panel cartons must contain UL label for acoustical compliance.
4. All suspension system cartons must contain UL label for load compliance per ASTM C635.

I. Warranty
1. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
   a. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
   b. Grid System: Rusting and manufacturer's defects
   c. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
2. Warranty Period Armstrong Humiguard:
   a. Acoustical panels: Ten (10) years from date of substantial completion.
   b. Grid: Ten (10) years from date of substantial completion.
   c. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.
3. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.7 DELIVERY AND STORAGE OF MATERIALS

A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements.

B. Storage:
1. Panels: Storage time of materials at the job site should be as short as possible and environmental conditions should be as near as possible to those specified for occupancy. Excess humidity during storage can cause expansion of material and possible warp, sag, or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.
2. Suspension System: Store in manner that will prevent warping, scratches and damage of any kind.

C. Handling: Handle in such manner to ensure against racking, distortion, or physical damage of any kind.

D. Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and panels, store them at a location where temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

1.8 FIELD CONDITIONS

A. Maintain uniform temperature and humidity prior to, during, and after installation. Do not use ceiling panels in extreme or continuous high humidity, or areas exposed directly to weather or water. Ceiling panels are sized and designed for use within the standard occupancy range of temperature and humidity, 65-85 °F, no more than 70% RH (relative humidity). Humidity can

greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours.

B. Allow time for dimensional changes in ceiling panels stored at temperature/humidity conditions well outside of those recommended for service. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium. With increases in temperature/humidity, these products expand (up to 1/64 in./ft. at 85 °F, 90% RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersize, but expand to normal when standard ambient conditions return.

C. For some pattern edge details, if perimeter panels must be cut smaller, the cut edge must be field-rabbited, or the wall angle must be lowered by reveal depth.

D. Indicate formaldehyde VOC Classification, as tested by ASTM D5116 and according to standards established by the Collaborative for High-Performance Schools (CHPS), the State of Washington, the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), and the American National Standards Institute (ANSI) & The California Office of Environmental Health Hazard Assessment (COEHHA).
   1. “Formaldehyde-free”
      a. The California Office of Environmental Health Hazard Assessment recognizes products with emissions of less than 3 parts per billion (ppb) as "formaldehyde-free".
   2. "Low Formaldehyde"
      a. The Collaborative for High Performance Schools standard for VOC emissions limits the amount to 13.5ppb = 0.0135 ppm = 16.5µg/m3 as a Low Formaldehyde VOC Class panels.

E. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.9 SEQUENCING

A. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustic units after interior wet work is dry, including residual moisture from plaster, concrete, or terrazzo work.

1.10 EXTRA MATERIALS

A. Acoustic Ceiling Units: Furnish quantity of five percent of total acoustic unit area installed of each tile to Owner.

B. Exposed Suspension System Components: Furnish quantity of two percent of total amount installed to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems:
   1. Same as for acoustical units.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with the following:

2.3 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.
   1. VOC Content: As specified in Section 01 61 16.

B. Acoustical Tile: Painted mineral fiber, ASTM E1264, Type IV Class A with to the following characteristics:
   1. Size: 24 x 24 inches.
   2. Thickness: 3/4 inches.
   3. Light Reflectance: Not Less than 88 percent, determined in accordance with ASTM E1264.
   4. Noise Reduction Coefficient (NRC): Not less than .75 determined as specified in ASTM E1264.
   5. Ceiling Attenuation Class (CAC): Not less than 35, determined in accordance with ASTM E1264.
   6. Flame Spread: < 25
   7. Smoke Developed: < 50
   8. Bio Block Anti Mold and Mildew
   9. Edge: Square.
   10. Warranty: 30 Year with suspension
   11. Surface Pattern: Fine Textured.
   12. Surface Color: As indicated on drawings.
   13. Products:
      a. Basis of Design: Ultima Square Lay-in #1910.

C. Acoustical Panels: Painted faced mineral fiber, ASTM E 1264 Type III, Class A with the following characteristics:
   1. Size: 24 by 24 inches.
   2. Thickness: 7/8 inches.
   3. Light Reflectance: Not Less than 86 percent, determined in accordance with ASTM E1264.
   4. Noise Reduction Coefficient (NRC): Not less than .80, determined as specified in ASTM E1264.
   5. Ceiling Attenuation Class (CAC): Not less than 35, determined in accordance with ASTM E1264.
   6. Edge: Square.
   7. Surface Color: As indicated on drawings.
   8. Flame Spread: < 25
   9. Smoke Developed: < 50
   10. Bio Block Anti Mold and Mildew
   11. Recycled Content: 50% or greater
   12. Warranty: 30 year with suspension
   13. Surface Pattern: Fine Texture.
   14. Products:
      a. Basis of Design: Ultima Health Zone High NRC #1445 Total Acoustics™.

D. Decorative Metal Supension System: Steel, Painted
   1. Thickness: 15/16 inch.
   2. Size: 24" x 5/16" x 1-1/2"
   3. Surface Pattern: Smooth.
   4. Surface Color: As indicated in drawings.
   5. Main Tee- AX73013XX

6. 4’ Tee- AX73423XX
7. 2’ Tee-AX73283XX
8. Wall Molding – AX78003XX
9. 6” Axiom Perimeter Trim – AX6CUR3XX
10. Products:
    a. Basis of Design: Armstrong 360 Degree Painted Grid Prelude XL 15/16", 2' Cross Tee https://www.armstrongceilings.com/.

2.4 SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.

B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
1. Classification: Heavy Duty
2. Main Tee-7301
3. 4’ Tee-XL7341
4. 2’ Tee-XL8320
5. Molding: 7800
6. General Finish: White
7. Products:
    a. Basis of Design: Prelude XL by Armstrong.

2.5 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

C. Hold-Down Clips: Manufacturer's standard clips to suit application.

D. Perimeter Moldings: Same metal and finish as grid.
1. Angle Molding: L-shaped, for mounting at same elevation as face of grid.

E. Axiom Classic Extruded Aluminum Trim:
1. Material: Alloy 6063 aluminum.
2. Hanging Clip, T-Bar Connector Clip and Splice Plate: Galvanized steel.
3. Surface Finish: factory applied baked polyester paint finish.
4. Cross Tee / Main Beam Interface: Flush fit
5. End Detail: Splice with screws.
6. Transitions:
    a. Axiom Transitions.
7. Warranty: Ten year limited warranty.
8. Color: As indicated on drawings.
9. Shape: Curved
10. Size: As indicated on drawings.
11. Accessories: Aircraft cable, Welded-Up Corners, Painted Metal Fascia, Rivets and Silicone as required for installation of acoustical clouds and ceilings as detailed.
12. Basis of Design: Armstrong Classic Axoim Trim, https://www.armstrongceilings.com/

F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.2 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

C. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

3.3 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636/C 636M and manufacturer's instructions, and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Install in bed of acoustical sealant.
   2. Use longest practical lengths.
   3. Overlap and rivet corners.

E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch clearance between grid ends and wall.

G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

K. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

L. Where installing sheet metal trim between two overlapping ceiling planes, provide a StrongBack Support (SB-12) as an attachment point for the lower ceiling plane. Span entire length of connection.

3.4 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

F. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter molding.

G. Install hold-down clips on panels within 20 ft of an exterior door.

3.5 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

3.7 SCHEDULE

A. Refer to drawings for Finish Key and Schedule

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Resilient tile/plank flooring.

B. Resilient base.

C. Installation accessories.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

C. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

D. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

E. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

1.3 REFERENCE STANDARDS

A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2015).

B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2019.

C. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017a.

D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2019.

E. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2017.

F. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).

G. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2018a.

H. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.

I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2019.

J. UL 2824 - GREENGUARD Certification Program Method for Measuring Microbial Resistance From Various Sources Using Static Environmental Chambers; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Field verify actual measurements before fabrication; indicate recorded measurements on shop drawings. Indicate floor patterns, colors and seaming plan.

D. Verification Samples: Submit two samples, 12" x 12" illustrating color and pattern for each resilient flooring product specified.

E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.

G. Manufacturer's Qualification Statement.

H. Installer's Qualification Statement.

I. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Materials: Quantity equivalent to 5 percent of each type and color.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.6 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Construct tile mock-up of each product type, incorporating all components specified for the location including transitions and trims.
   1. Minimum size of mock-up is 6 x 6 foot.
   2. Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
   3. Approved mock-up may remain as part of the Work upon Architect approval.

1.7 QUALITY ASSURANCE

A. Surface Burning Characteristics:
   1. Floor Finishes: Class i, when tested in accordance with ASTM E-648 Flooring Radiant Panel Critical Radiant Flux.
   2. Base Material: Class i, minimum 0.45 watts/sq.cm. when tested in accordance with NFPA 253.

B. All materials to conform to ASTM E648, Critical Radiant Flux Class 1, ASTM E662 with a smock density of 450 or less.

C. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

D. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

E. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Section 01 6000 - Product Requirements: Product storage and handling requirements.

E. Protect roll materials from damage by storing on end.

F. Do not double stack pallets.

1.9 FIELD CONDITIONS

A. Maintain Temperature in storage area between 55 degrees Fahrenheit and 90 degrees Fahrenheit.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.10 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Furnish 10 percent of installed vinyl tile flooring and base, 5 percent of installed linoleum flooring and 5 percent of rubber flooring of each type and color specified. Deliver all required overage and maintenance stock to owner's specified location prior to start of installation.

C. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials and suggested schedule for cleaning, stripping and re-waxing.

PART 2 PRODUCTS

2.1 TILE FLOORING

A. Manufacturers:
   1. Nora Flooring: www.nora.com/us
   2. Interface: www.interface.com
   3. Tarkett; Johnsonite: www.johnsonite.com
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Luxury Vinyl Tile: Class III Printed Vinyl Plank.
   1. Manufacturers:
      a. Interface Flooring; https://www.interface.com/.
      b. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.

3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
4. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with UL 2824.
5. VOC Content Limits: As specified in Section 01 61 16.
6. Plank Size: ~ 9.845 by 39.38 inch.
7. Wear Layer Thickness: 22 inch.
8. Total Thickness: 4.5 mm.
9. Pattern: As indicated on drawings.
10. Installation Method(s): As indicated on drawings
11. Color(s): As indicated on drawings.
12. Basis of Design: Interface Brushed Lines Collection https://www.interface.com

2.2 RESILIENT BASE

A. Manufacturers:
   1. Johnsonite, Inc. www.johnsonite.com.
   2. Roppe Corp. www.roppe.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Resilient Base: ASTM F 1861, vinyl ; Coved (Resilient Floor), Coved (Carpet).
   1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   2. Height: 4 inch, 6 inch as scheduled
   3. Thickness: 0.125 inch thick.
   4. Finish: Matte.
   5. Length: Roll.
   6. Color: Refer to Finish Key and Schedule.
   7. Accessories: Premolded external corners and end stops.

2.3 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types as recommended by flooring manufacturer.
   1. Adhesive shall be suitable for use in applications with up to 99% RH, and shall be approved for use over selected remedial floor coating.
   2. VOC Content Limits: As specified in Section 01 61 16.

C. Adhesive for Vinyl Flooring:
   1. Manufacturers:
      a. XL Brands, HM99 High Moisture Adhesive; https://xlbrands.com/.
      b. Or approved equal.
      c. Substitutions: Section 01 60 00 - Product Requirements.

D. Moldings, Transition and Edge Strips: Same material as flooring.
   1. Product: Slim Line Transitions manufactured by Johnsonite.
   2. Thickness: As required by installation and to comply with ADA Regulations.
   3. Color: As indicated on drawings..
      a. Substitutions: See Section 01 60 00 - Product Requirements.

E. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

D. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.

3.3 INSTALLATION - TILE FLOORING

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
   1. Spread only enough adhesive to permit installation of materials before initial set.
   2. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 26 05 26 for grounding and bonding to building grounding system.
   3. Fit joints and butt seams tightly.
   4. Set flooring in place, press with heavy roller to attain full adhesion.

D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Resilient Strips: Attach to substrate using adhesive.

F. Install planks in as indicated on drawings, allow minimum 1/2 full size plank width at room or area perimeter.

G. Mix tile/planks from container to ensure shade variations are consistent when tile is placed.

H. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

3.4 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Cove/Toeless Base: Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

E. Reveal Base: Miter all corners.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.

B. Remove excess adhesive from floor, base, and wall surfaces without damage.

C. Clean, seal and maintain in accordance with manufacturer's instructions.

3.6 PROTECTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Prohibit traffic on resilient flooring for 48 hours after installation.

C. Upon completion of installation, protect resilient flooring in traffic areas with heavy duty kraft paper.

3.7 SCHEDULE

A. Refer to Finish Keys and Schedules

END OF SECTION

SECTION 09 66 23
RESINOUS MATRIX TERRAZZO FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Epoxy matrix terrazzo with ground and polished finish.

B. Divider strips.

C. Precast epoxy terrazzo stair units.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete subfloor with steel trowel finish.

B. Section 07 92 00 - Joint Sealants: Sealing joints between terrazzo work and adjacent construction and fixtures.

C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.3 REFERENCE STANDARDS

A. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2018.

C. ASTM D648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position; 2018.

D. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

E. NTMA (GRAD) - Aggregate Gradation Standards; Current Edition.

F. NTMA (EPOXY) - Epoxy Terrazzo Specifications; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for divider strips, control joint strips, expansion joints, and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.

C. Shop Drawings: Indicate divider strip and control and expansion joint layout, and details of adjacent components. For precast units, detail profile and anchorage requirements.

D. Samples: Submit two samples, 6 inch by 6 inch in size illustrating each color, chip size and variation, chip gradation, matrix color, and typical divider strip.

E. Manufacturer's Qualification Statement.

F. Installer's Qualification Statement.

G. Cleaning and Maintenance Data: Include procedures for stain removal, stripping, and sealing.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with NTMA recommendations as posted at their web site at www.ntma.com unless more stringent requirements are specified.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
   1. Minimum ten years of documented experience.
   2. Associate member firm of the National Terrazzo and Mosaic Association, Inc.

C. Surface Burning Characteristics: When tested in accordance with ASTM D635, the Epoxy terrazzo shall comply with the following value: Self-Extinguishing, extent of burning 0.25 inches maximum. ASTM D648, Critical radiant flux, 1.0.

D. Installer Qualifications: Company specializing in performing the type of work specified in this section.
   1. Minimum ten years of documented experience.
   2. Approved by matrix manufacturer.
   3. Contractor member of the National Terrazzo and Mosaic Association, Inc.

E. Single Source Responsibility: To obtain combined warranty for the installed flooring system from manufacturer; obtain primary epoxy terrazzo flooring system materials including membranes, primers, moisture vapor primers, resins and hardening agents from a single manufacturer with proof of NTMA membership. Obtain aggregates, divider strips, sealers and cleaners from source recommended by primary materials manufacturer.

F. Warranty: Installer to warrant installation for two years upon completion of work in this Section for defects in workmanship.

1.6 MOCK-UP

A. Section 01 40 00 - Quality Requirements: Requirements for mock-up.

B. Construct mock-up of terrazzo illustrating appearance of finished work in each configuration required. Size mock-up to be not less than 8 by 8 feet.

C. Locate where directed by Architect..

D. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Products Requirements: Product storage and handling requirements.

B. Store terrazzo materials in a dry, secure area.

C. Maintain minimum temperature of 60 degrees F.

D. Keep products away from fire or open flame.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meetings.

B. Convene minimum one week prior to commencing work of this section.

1.9 FIELD CONDITIONS

A. Do not install terrazzo when temperature is below 50 degrees F or above 90 degrees F.

B. Maintain ambient and substrate temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.

C. Storage temperatures should be between 50 degrees F to 80 degrees F.

D. Prior to and during installation, the terrazzo contractor shall verify that the dew point is at least 5 degrees Fahrenheit less than the slab and air temperature.

E. Provide ambient lighting level of 50 ft candles, measured at floor surface.

1.10 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate placement of terrazzo divider strips with location of mechanical and electrical access covers, floor mat frames, and other items built in to terrazzo.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Terrazzo & Marble Supply Companies; Terroxy Resin Systems: www.tmsupply.com. or Equal

B. Other Acceptable Manufacturers - Resinous Matrix Terrazzo Flooring:
1. Key Resin Company; Key Epoxy Terrazzo System: www.keyresin.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 EPOXY MATRIX TERRAZZO APPLICATIONS

A. Floors:
1. Thickness: 3/8 inch, nominal.
2. Color(s): Patch to Match Existing Adjacent
3. Aggregate Type: Patch to Match Existing Adjacent.
4. Aggregate Size: Patch to Match Existing Adjacent.

B. Wall Base: Precast epoxy terrazzo.
1. Thickness: Same as floors.
2. Color(s): See Finish Key
3. Aggregate Type and Size: Same as floors.

C. Stairs - Treads:
1. Thickness: 1-1/2 inch, minimum.
2. Color(s): Match exisiting adjacent terrazzo floors
3. Aggregate Type and Size: Match existing adjacent terrazzo floors.

2.3 MATERIALS

A. Epoxy Matrix Terrazzo: Aggregate and matrix mix applied to substrate, troweled flat, and ground smooth.
1. Mix Proportions: As required to achieve appearance specified, refer to Finish Key on Drawings.

B. Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
1. Products:

a. Terrazzo & Marble Supply Companies; Terroxy Epoxy Matrix: www.tmsupply.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Aggregate: Type as indicated; sized in accordance with NTMA aggregate gradation standards; color(s) as indicated, uniform in color.
1. Products - Glass Chips:
a. American Specialty Glass: www.americanspecialtyglass.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

D. Finishing Grout: Epoxy, color to match terrazzo matrix.

E. Precast Epoxy Terrazzo Units: Fabricate to sizes and profiles indicated on drawings.
1. Setting Material: Latex Portland cement mortar, ANSI A118.4.

F. Crack Mitigating Membrane: Terroxy Iso-Crack Epoxy Membrane, for 10% of areas receiving epoxy terrazzo including base. Install reinforcing mesh for control joints, cold joints, substrate crack preparation and reflective crack reduction as recommended by manufacturer.

2.4 ACCESSORIES

A. Divider Strips: 1/8 inch thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.

B. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.

C. Primer: 100% solids epoxy primer as manufactured by epoxy matrix manufacturer is required.

D. Crack Bridging Membrane: 100% solids, flexible epoxy installed at 40 mils installed on 100% of slab to receive epoxy terrazzo.

E. Patching and Fill Material: 100% epoxy fill and selected aggregates as recommended by epoxy matrix manufacturer.

F. Base Cap, Base Divider Strip, and Separator Strip: Match divider strips.

G. Non-Slip Inserts: Provide channel-shaped inserts filled with a mixture of resin and fine, abrasive aggregate.

H. Anchors and Reinforcement for Precast Units: As recommended by manufacturer for type of installation.

I. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components.
1. Products:
a. Terrazzo & Marble Supply Companies; T-Rx: www.tmsupply.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive terrazzo.

C. Saw cutting of concrete control joints must be done between 12 and 24 hours after placement of the structural concrete and at a frequency and depth meeting ACI recommendations

D. Slab on grade concrete to have an efficient moisture vapor barrier directly under the concrete slab. Moisture vapor barrier shall not be punctured and shall be sealed with a vapor barrier grade flashing tape at all terminations, penetration and seams.

E. Do not begin terrazzo work until concrete substrate has cured 28 days, minimum.

F. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive terrazzo.

G. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.

H. Verify that wood subfloors have 12 percent maximum moisture content.

I. Cementitious Subfloor Surfaces: Verify that substrates are ready for terrazzo flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by terrazzo flooring manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

J. Test for moisture according to ASTM F2170 (determining relative humidity in concrete slabs using in situ probes). An effective in situ probe for relative humidity testing is the Rapid RH available from Terrazzo & Marble Supply.

K. Proceed with installation only after substrates have a maximum relative humidity measurement reading less than 80%
   1. Moisture Vapor Treatment is required for all slabs on grade and lightweight structural concrete.

L. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Clean substrate of foreign matter.

B. Prepare concrete subfloor by mechanically abrading surface in accordance with manufacturer's instructions.

C. Prepare concrete surfaces according to ICRI 310.2R, CSP 3, minimum.

D. Provide sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil and other contaminants incompatible with terrazzo.
   1. Prepare concrete mechanically by shot blasting. Surface preparation results should achieve a CSP3-CSP5 profile according to International Concrete Repair Institute Guideline No. 03732.
   2. Repair cracks and non-expansion joints greater than 1/16” (1.6 mm) wide according to TerroxyÒ Resin Systems Technical Bulletin 009 Crack Detailing and Joint Treatments for TerroxyÒ Resin Thin-set Epoxy Terrazzo.
      a. Provide up to 100 linear feet of crack repair, to be installed per above referenced Technical Bulletin 009, as directed by the Architect.

E. Apply primer in accordance with manufacturer's instructions.

3.3 INSTALLATION

A. Install divider and control joint strips in adhesive setting bed without voids below strips or mechanically anchor strips as required to attach strips to substrate.

B. Install divider strips according to pattern approved on shop drawings.

C. Install non-slip inserts in floors and stair treads where indicated.

D. Install base and border divider and control joint strips to match floor pattern.

E. Place terrazzo mix over substrate to thickness indicated.

F. Detail strip layout according to NTMA Guidelines.

G. Anchor precast units as indicated on drawings.

H. Install precast units using specified setting material.

I. Rough Grinding: Grind with 24 or 80 grit diamond or stone until all Terrazzo strips and marble chips are uniformly exposed. Continue grinding process with 120 grit metal diamond, resin diamond or stone.

J. Grouting:
   1. Cleanse floor with clean water and rinse.
   2. Remove excess rinse water by wet vacuum, dry and fill voids with TerroxyÒ Resin Systems Epoxy Matrix or Clear Resin.
   3. Allow grout to cure 24 hours minimum. Grout may be left on terrazzo until other trades work is completed.

K. Polishing: Grind with 200 grit or finer metal diamond or diamond pads until all grout is removed from surface. Repeat grout coat and polishing if large terrazzo chip voids exist after initial polishing. Produce surface with a minimum of 70 percent aggregate exposure.

L. Maintain the ambient room and floor temperature at 55□F or above for a period extending 72 hours before, during and after floor installation. Concrete to receive epoxy terrazzo shall have cured for at least 28 days and be free of all curing compounds. Test concrete substrate to determine acceptable moisture levels prior to installation. Testing should be conducted according to ASTM F2170 (determining relative humidity in concrete slabs using in situ probes).

3.4 PRECAST TERRAZZO INSTALLATION

A. Install precast units using method recommended by NTMA and manufacturer unless otherwise indicated.

B. Seal joints between units with joint sealants.

3.5 FINISHING

A. Finish terrazzo to NTMA requirements.

B. Produce terrazzo finish surface to match approved mock-up, with 70 percent chip exposed.

C. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using a wet method or using a dry grinder with vacuum to control dust to a 120 grit finish prior to grouting.

D. Cleanse: Clean the floor with water and rinse. Remove excess rinse water by wet vacuum and repeat process if necessary to remove all water and grinding dust. Allow the floor to completely dry before continuing with grouting.

E. Apply grout to fill voids exposed from grinding.

F. Remove grout coat by grinding, using a fine grit abrasive.

G. Hand grind vertical and curved surfaces similarly.

3.6 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.

C. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

3.7 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.

B. Scrub and clean terrazzo surfaces with neutral pH cleaner in accordance with manufacturer's instructions. Let dry.

C. Immediately after terrazzo has dried, apply a minimum of 2 coats of sealer in accordance with manufacturer's instructions.

D. Polish surfaces in accordance with manufacturer's instructions.

3.8 PROTECTION

A. Protect finished terrazzo from damage due to subsequent construction until Date of Substantial Completion.

B. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

3.9 SCHEDULE

A. Refer for Finish Key and Schedules on Drawings for mix design, including but not limited to: aggregate type, size and color for each finish specified.

END OF SECTION

SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Carpet tile, fully adhered, and accessories.

B. Removal of existing carpet tile.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 74 19 - Construction Waste Management and Disposal: Reclamation/Recycling of new carpet tile scrap.

C. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

D. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

E. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

F. Section 09 65 00 -Resilient Flooring: Base finish and termination edging of adjacent floor finish.

1.3 REFERENCE STANDARDS

A. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

B. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.

C. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2019.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.

D. Samples: Submit three carpet tiles illustrating color and pattern design for each carpet color selected.

E. Submit three, two inch long samples of edge strip.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

J. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum five years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum five years experience.

C. Surface Burning Characteristics:
   1. Floor Finishes: Comply with one of the following:
      a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
      b. CPSC 16 CFR 1630.

D. Smoke Density: NBS Smoke Chamber Flaming Mode 450 or less when tested in accordance with NFPA-253.

E. Light fastness: Comply with AATCC 16-E

1.6 CLOSEOUT SUBMITTALS

A. See Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: submit maintenance procedures, recommended maintenance materials and suggested schedule for cleaning.

1.7 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum two week prior to commencing work of this section.

1.8 PRODUCT DELIVERY AND HANDLING

A. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached. Maintain wrappers and protective covers in place until carpet is ready for installation.

B. Deliver all required overages and maintenance stock to owner's specified location prior to beginning installation.

1.9 FIELD CONDITIONS

A. Section 01 60 00 - Product Requirements.

B. Store materials inside, protected from weather, moisture and soiling.

C. Store materials in area of installation for minimum period of 48 hours prior to installation.

D. Maintain minimum 70 degrees F ambient temperature 72 hours prior to, during and 24 hours after installation.

E. Precondition: All of the carpet shall be spread in a room on site 14 days prior to actual installation with the room preconditioned at a minimum of 70 degree F with humidity between 35% to 65%.

F. Ventilate installation area during installation and for 72 hours after installation.

1.10 EXTRA MATERIALS

A. See Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Supply 5 percent of carpet of each type, color, and pattern specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Tile Carpeting:
1. Basis of Design: Interface Carpets www.interface.com, www.flors.com
2. Shaw Contract www.shawcontract.com.
3. Mannington Commercial Carpet: www.mannington.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. Carpet Tile :Tufted , manufactured in one color dye lot.
1. Basis of Design: Manufactured by Interface Honor Roll Collection, Cubic Series.or Equal
2. Tile Size: 19.5 x 19.5 inch, nominal.
3. Backing system: GlasBac Tile
4. Yarn manufacturer: Aquafil
5. Yarn system: 100% Recycled Content Type 6 Nylon
6. Color System: 100% Solution Dyed
7. Construction: Tufted Pattern Loop
8. Lifetime Antimicrobial: Intersept
9. Soil Stain Protection: Protekt
10. Tufted Yarn Weight: 26 oz min
11. Flooring Radiant Panel: ASTM E-648 Class 1
12. Color(s): Refer to Finish Key .
13. Installation Method: Non-directional
14. Substitutions: Section 01 60 00 - Product Requirements.

2.3 ACCESSORIES

A. Sub-Floor Filler: type recommended by flooring material manufacturer.

B. Moldings and Edge Strips: Rubber, color as selected by architect.

C. Adhesives:
1. Compatible with materials being adhered; maximum VOC content as specified in Section 01 61 16.

D. Carpet Tile Adhesive: As recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

D. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

E. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Remove existing carpet tile.

B. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.

3.3 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.

C. Do not mix carpet from different cartons unless from the same dye lot.

D. Blend carpet from different cartons to ensure minimal variation in color match.

E. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

F. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

G. Lay carpet tile as specified, set, aligned and patterned as indicated on drawings.

H. Locate change of color or pattern between rooms under door centerline.

I. Fully adhere carpet tile to substrate.

J. Trim carpet tile neatly at walls and around interruptions.

K. Complete installation of edge strips, concealing exposed edges.

3.4 SCHEDULE

A. Refer to Finish Key and Schedules.

END OF SECTION

SECTION 09 72 00
WALL COVERINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vinyl Wallcovering

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 09 91 23 - Interior Painting: Preparation and priming of substrate surfaces.

1.3 REFERENCE STANDARDS

A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2002 (Reapproved 2013).

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

C. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on wall covering and adhesive.

C. Shop Drawings: Indicate wall elevations with seaming layout.

D. Samples: Submit two samples of wall covering, full width by 36 inch long in size illustrating color, finish, and texture. Verify image and substrate with Interior Designer/Architect/Owner.
   1. Wall Protection Sample: From same production run to be used for the work, with specified finish applied. Show complete pattern repeat. Mark top and face of fabric.

E. For each type of wall protection submit two samples for each color, pattern, texture, and finish specified, full width by 36-inch- (914-mm-) long in size.
   1. Wall protection sample: From same production run to be used for the Work, with specified finish applied. Show complete pattern repeat. Mark top and face of fabric.

F. Manufacturer's Installation Instructions: Indicate special procedures.

G. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Wall Covering Materials: 25 linear feet of each color and pattern of wall covering; store where directed.
   3. Package and label each roll by manufacturer, color and pattern, and destination room number.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 MOCK-UP

A. Provide image full height, illustrating installed wall covering and joint seaming technique.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.8 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

C. Lighting: Do not install wall protection until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive material.

D. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall protection manufacturer for full drying or curing.

1.9 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall protection applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency.
      a. Flame-Spread Index: 5 or less.
      b. Smoke-Developed Index: 40 or less.

PART 2 PRODUCTS

2.1 WALL COVERINGS

A. General Requirements:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 15/55, maximum, when tested in accordance with ASTM E84.
   2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.

B. Wall Covering: FS CCC-W-408D Type III, Heavy Duty products
   1. Comply with ASTM F793/F793M, Category VI, Type III.
   2. Total Weight: 33 oz./ Lineal Yd.
   3. Roll Width: 52 inches.
   4. Content: 100% Olefin Composite
   5. Backing: Dense Polyester/Cotton fabric.
   6. Color: As indicated on drawings.
   7. Finish: Surcoat stain and abrasion resistant treatment
   8. Surface Abrasion: Passes ASTM D4977—Level 3
   9. Surface Indentation: Passes ASTM D5420—Level 2
   10. Permeability Rating: 1
   11. Low Emitting VOCs: Passes Cal 01350 standard
   12. Breaking Strength, lbs. Force (Newton)
      a. Machine Direction: 50 (222)
      b. Cross Machine Direction: 55 (245)
   13. Tearing Strength, Scale:
      a. Machine Direction: 25
      b. Cross Machine Direction: 25
   14. Coating Adhesion, lbs. Force for 1 Width : 3
   15. Coating Adhesion, Newtons for 2.5 cm: 13.35
   16. Abrasion Resistance, Double Rubs/Min.:300
   17. Colorfastness to Light: 200
   18. Blocking, Scale Rating Max: 2
   19. Crocking, Scale Rating Min.: Good
   20. Cold Crack Resistance: -20ºF (no change)
   21. Shrinkage, Percent Max.
      a. Machine Direction: 2
      b. Cross Machine Direction: 1
   22. Stain Resistance:
      a. Washability, Double Rubs/Min:100
      b. Scrubbability, Double Rubs/Min: 300
   23. Flame/Smoke Certifications: NFPA 265, CCCW 408 A, CCCW 408D, MEA No. 404-00-M.
   24. Basis of Design:
      a. Wolf-Gordon; Rampart Resolve PVC-Free Wall Protection, LUXOR Series, https://www.wolfgordon.com/.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Adhesive: Mildew-resistant, nonstaining, clay-based vinyl wallcovering adhesive, for use with specific wall protection and substrate application indicated and as recommended in writing by wall protection manufacturer..

D. Termination Trim: Extruded plastic, clear.

E. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

F. Substrate Primer and Sealer: Acrylic or latex wallcovering primer/sealer complying with requirements in Interior Painting and recommended in writing by primer/sealer manufacturer and wall protection manufacturer for intended substrate.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine wall protection to ensure that the material, color, and quality are satisfactory and as ordered. Check that the quantity and dimensions match the required specifications, prior to cutting.

B. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Verify that substrate surfaces are prime painted and ready to receive work, and comply with requirements of wall covering manufacturer.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.
   1. Moisture Content: Maximum of 4 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
   2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and protection manufacturer.
   3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall protection manufacturer.

F. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.2 PREPARATION

A. Comply with manufacturer’s written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall protection material, including dirt, oil, grease, mold, mildew, and incompatible primers

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects. The finished surface should be at least Level 4 as per the Gypsum Association guidelines, although Level 5 is preferred.
   1. Moisture Content: Maximum of 4 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
   2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and protection manufacturer.
   3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall protection manufacturer.

D. Check painted surfaces for pigment bleeding, moisture resilience, and adhesion. Sand gloss, semigloss, or eggshell finish with fine sandpaper.

E. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

F. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

G. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

H. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.

I. Marks: Seal with shellac those that may bleed through surface finishes.

J. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

K. Vacuum clean surfaces free of loose particles.

L. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

M. Acclimate wall protection in the installation area for at least six days prior to and after installing at 70º–90ºF, with relative humidity at 50% or less.

3.3 INSTALLATION

A. Preinstallation Conference: Conduct conference at Project site.

B. Hanging Information: Reverse hang, random match.

C. Comply with wall protection manufacturer’s written installation instructions applicable to products and applications indicated.

D. Cut wall protection material into full width strips in roll number sequence. Change the roll numbers at partition breaks and corners.
   1. Install strips in same order as cut from roll.

E. For solid-color, even-texture, or random-match patterns, reverse every other strip.

F. Install wall protection without lifted or curling edges and without visible shrinkage.

G. Match pattern per manufacturers direction above the finish floor.

H. Apply adhesive and wall covering in accordance with manufacturer's instructions.

I. Apply adhesive to wall surface immediately prior to application of wall covering.

J. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.

K. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.

L. Butt edges tightly.

M. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

N. Fully bond wall protection to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

O. Horizontal seams are not acceptable.
   1. If railroading is required (horizontal application) install seams vertical and plumb at least 8 inches (203 mm) from outside corners and 8 inches (203 mm) from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not recommended unless necessary for application.

P. Do not seam within 2 inches of internal corners or within 6 inches of external corners.

Q. Install wall covering before installation of bases and items attached to or spaced slightly from wall surface.

R. Do not install wall covering more than 1/4 inch below top of resilient base.

S. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

T. Cover spaces above and below windows, above doors, in pattern sequence from roll.

U. Install termination trim.

V. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

W. Do not install wall protection until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive material.

X. Provide continuous ventilation during installation and for not less than the time recommended by wall protection manufacturer for full drying or curing.

3.4 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

C. Use cleaning methods recommended in writing by wall protection manufacturer.

D. Replace strips that cannot be cleaned.

E. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

3.5 PROTECTION

A. Do not permit construction activities at or near finished wall covering areas.

3.6 SCHEDULES

A. Refer to Finish Key and Schedule

END OF SECTION

SECTION 09 84 30
SOUND-ABSORBING WALL AND CEILING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sound-absorbing panels.

1.2 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting.

1.3 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's printed data sheets for products specified.

C. Shop Drawings: Fabrication and installation details, panel layout, fabric orientation, and wood grain orientation.

D. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.

E. Manufacturer's qualification statement.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Panels: Quantity equal to 5 percent of total installed, but not less than one of each type.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.

B. Store units flat, in dry, well-ventilated space; do not stand on end.

C. Protect edges from damage.

1.7 MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for additional mock-up requirements.

B. Construct mock-up of acoustical units at location as indicated by Architect.
   1. Minimum mock-up dimensions; 96x48 inches.
   2. Mock-up may remain as part of work.

PART 2 PRODUCTS

2.1 PET FELT WALL PANELS:

A. Panel: Maufacturer's standard polyester (PET) felt, 60% pre-consumer recycled

B. Noise Reduction Coefficent (NRC): .45 when tested in accordance with ASTM C423

C. Mounting Type: Manufacurer's recommened adhesive

D. Panel Size: As indicated on drawings

E. Color(s): Refer to Finish Key

F. Panel Thickness: 12mm +/- 10%

G. Edges: Exposed felt, machine egde

H. Corners: Square

I. Pattern(s): As indicated on drawings

J. Warranty: 20 years

K. Product:
   1. Basis of Design: Acoufelt, Fracture Collection, Grid Series. https://acoufelt.com/
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FABRICATION

A. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and squareness from corner to corner.

2.3 ACCESSORIES

A. Panel Adhesive: Acceptable to acoustical panel manufacturer for application as indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.

B. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.

C. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
   1. Plumb and level.
   2. Flatness.

3.3 CLEANING

A. Clean sound-absorptive panels upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

B. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.4 PROTECTION

A. Provide protection of installed acoustical panels until Date of Substantial Completion.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Exposed surfaces of steel lintels and ledge angles.
   3. Mechanical and Electrical:
      a. On the roof and outdoors, paint equipment exposed to weather or to view, including factory-finished materials.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, zinc, and lead.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Glass.
   9. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

A. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

F. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
   3. Allow 30 days for approval process, after receipt of complete samples by Architect.
   4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.

1.6 MOCK-UPS

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 12 feet long by 12 feet wide, illustrating paint color, texture, and finish.

C. Provide door and frame assembly illustrating paint color, texture, and finish.

D. Locate where directed by Architect.

E. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
1. PPG Paints: www.ppgpaints.com/#sle.
2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
3. Substitutions: Section 01 60 00 - Product Requirements..

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each paint material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.

C. Colors: As indicated on drawings.
1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Exterior Plaster and Stucco: 12 percent.
   2. Fiber Cement Siding: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
   5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi at 6 to 12 inches. Allow to dry.
   3. Clean concrete according to ASTM D4258. Allow to dry.
   4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

H. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.
   3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.

I. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

J. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.

K. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

L. Concrete Floors and Traffic Surfaces: Remove contamination, using alkaline based cleaners where required, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

M. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

F. Apply each coat to uniform appearance.

G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

H. Sand wood and metal surfaces lightly between coats to achieve required finish.

I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.7 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON SHERWIN WILLIAMS UNLESS NOTED OTHERWISE.

A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view.
   1. One coat of Loxon Block Surfacer(LX01W0200) @ 8.8 MDFT.
   2. Two coats of ConFlex Acrylic Coating (CF13W0051) @ 3.5 MDFT.

B. Concrete Canopies (High School Only)
   1. 1 Coat Loxon Acrylic Block Surfacer or Loxon Conditioner
   2. 2 Coats Loxon XP (for waterproofing)

C. Exterior Gypsum Board: Finish surfaces exposed to view.
   1. One coat of Loxon Masonry Primer Sealer(LX02W0050) @ 3.2 MDFT.
   2. Two coats of ConFlex Acrylic Coating(CF13W0051) @ 3.5 MDFT.

D. Exterior Plaster: Finish surfaces exposed to view.
   1. One coat of Loxon Masonry Primer Sealer(LX02W0050) @ 3.2 MDFT.
   2. Two coats of ConFlex Acrylic Coating(CF13W0051) @ 3.5 MDFT.

E. Wood: Finish surfaces exposed to view.
   1. One coat of Exterior LTX Wood Primer (B42W08141).
   2. Two coats Resilience Exterior Latex Satin.

F. Steel - Exposed steel lintels, Overhead doors, Frames, other Ferous metal:
   1. One coat Pro Industrial Pro-Cryl PR of W (B66W01310).
   2. Two coats DTM Acylic Semi gloss Coating (B66-200 Series).
   3. Application: Preparation and prime coat is to be applied in factory by steel fabricator.

G. Steel - Exposed steel columns and beams:
   1. Minimum surface preparation is to meet SSPC-SP6.
   2. Prime coat Pro Industrial Pro-Cryl PR of W (B66W01310).
   3. Two coats Pro Industrial WB ALK UR SG EW (B53W01151).
   4. Application: Preparation and prime coat is to be applied in factory by steel fabricator.

H. Galvanized Steel: Finish surfaces exposed to view.
   1. Two coats of Sher-Cryl HPA High Performance Acrylic (B66-300 Series) @ 2.5-4.0 MDFT.
   2. Application: Preparation and prime coat is to be applied in factory by fabricator.

3.8 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON PPG UNLESS NOTED OTHERWISE.

A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view.
   1. One coat of Perma-Crete Block & Masonry Surfacer/Filler 4-100XI @ 8.0 to 11.0 MDFT.
   2. Two coats of Perma-Crete 100% High Acrylic High Build Interior/Exterior Flat 4-22XI @3.2 to 5.8 mils.

B. Exterior Gypsum Board: Finish surfaces exposed to view.
   1. One coat of Perma-Crete 4-603XI Alkali resistant primer @ 1.4 MDFT, minimum.
   2. Two coats of Perma-Crete 100% High Acrylic High Build Interior/Exterior Flat 4-22XI @3.2 to 5.8 mils.

C. Exterior Plaster: Finish surfaces exposed to view.
   1. One coat of Perma-Crete 4-603XI Alkali resistant primer @ 1.4 MDFT, minimum.
   2. Two coats of Perma-Crete 100% High Acrylic High Build Interior/Exterior Flat 4-22XI @3.2 to 5.8 mils.

D. Wood: Finish surfaces exposed to view.
   1. One coat of water-based PPG Seal Grip Interior/Exterior Alkyd Universal Primer/Sealer 17-921XI
   2. Two coats of PPG Arci-Sheild Max Exterior Paint & Primer in One Satin 739-10.

E. Steel - Exposed steel lintels, Overhead doors, Frames, other Ferous metal:
   1. One coat ofSpeed Hide One-component, interior/exterior rust inhibitive steel primer 6-208 Series.
   2. Two coats of Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610.
   3. Application: Preparation and prime coat is to be applied in factory by steel fabricator.

F. Steel - Exposed steel columns and beams:
   1. Minimum surface preparation is to meet SSPC-SP6.
   2. One coat of Speed Hide One-component, interior/exterior rust inhibitive steel primer 6-208 Series.
   3. Two coats Sil-Shield Silicone Alkyd Enamel High Gloss 95-5000 Series.
   4. Application: Preparation and prime coat is to be applied in factory by steel fabricator.

G. Galvanized Steel: Finish surfaces exposed to view.
   1. Two coats of Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610.
   2. Application: Preparation and prime coat is to be applied in factory by fabricator.

3.9 COLOR SCHEDULE

A. Refer to Finish Key & Schedule.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Elevator pit ladders.
   3. Surfaces inside cabinets.
   4. Prime surfaces to receive wall coverings.
   5. Exposed walls and bottom of swimming pools and fountains.
   6. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Glass.
   9. Acoustical materials, unless specifically indicated.
   10. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 50 00 - Metal Fabrications: Shop-primed items.

C. Section 09 91 13 - Exterior Painting.

1.3 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.

C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).

D. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application; 2018.

E. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

G. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

H. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

I. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

J. SSPC-SP 2 - Hand Tool Cleaning; 2018.

K. SSPC-SP 3 - Power Tool Cleaning; 2018.

L. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

M. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
   3. Allow 30 days for approval process, after receipt of complete samples by Architect.
   4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.

1.7 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 10 feet long by 10 feet wide, illustrating paint color, texture, and finish.

C. Provide door and frame assembly illustrating paint color, texture, and finish.

D. Locate where directed by Architect.

E. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. PPG Paints: www.ppgpaints.com/#sle.
   2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. 6 CRR-NY, Chapter III, Subpart A.
      c. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
         1) Opaque, Flat: 50 g/L, maximum.
         2) Opaque, Nonflat: 150 g/L, maximum.
         3) Opaque, High Gloss: 250 g/L, maximum.
      d. Architectural coatings VOC limits of the State of New York.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.
   2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
   3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.3 PAINT SYSTEMS - SPECIALTY PAINTS

A. Green Screen Coating
   1. Acrylic based coating complying with ASTM E84, UV stable and non-yellowing.
   2. Designed for application by roller or spray over properly prepared gypsum wallboard surface with a minimum Level 4 finish.
   3. Coverage rate of 1.5 wet mils/ 0.50 dry mils at proper application.
   4. Gloss Level: Less than 5%; very matte.
   5. Product:
      a. Goo Systems; Chroma Key Green Coating: www.goosystemsglobal.com.
      b. Or Approved Equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been adequately prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean concrete according to ASTM D4258. Allow to dry.

3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

H. Concrete Floors and Traffic Surfaces: Remove contamination, using alkaline based cleaners where required, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

J. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

L. Galvanized Surfaces:
1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
2. Prepare surface according to SSPC-SP 2.

M. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

N. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

O. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

3.3 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

3.5 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.7 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON SHERWIN WILLIAMS UNLESS NOTED OTHERWISE.

A. Concrete Block:
   1. One coat Preprite Block Filler (B25) DFT- 8.0. (MPI #4)
   2. Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
   3. Exception: Previously Painted Concrete Block @ **Intermediate Library**, provide :
      a. One coat Extreme Bond Primer (B51) DFT- 0.9.
      b. Two coats ScuffTuff (S-26) @ 1.2 MDFT per coat.

B. Concrete:
   1. One coat Preprite Masonry Primer (B28W300) @ 3.0 MDFT. (MPI #149)
   2. Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT

C. Concrete Floors (Lt. - Med. Duty), unpainted:
   1. One coat ArmorSeal 8100 2.0-4.0 (50-100) (reduced with one pint of water per gallon)
   2. Two coats ArmorSeal 8100 2.0-4.0 (50-100)

D. Concrete Floors (Lt. - Med. Duty), painted:
   1. One coat spot prime bare areas with ArmorSeal 8100 2.0-4.0 (50-100)
   2. Two coats ArmorSeal 8100 2.0-4.0 (50-100)

E. Concrete Floors, Pigmented
   1. Sherwin Williams- Gloss Finish
   2. Tinted: See Finish Key
   3. 2 Coats Armorseal 8100 Finish B70-8100 Series @ 5.0 MDFT per coat. (MPI #83)

F. Steel and Metal - Steel access doors and frames, hollow metal doors and frames, all new removable mullions, stair railings, hollow metal Windows frames, existing painted fire extinguisher cabinets:
   1. One coat Pro Industrial Pro-Cryl PR of W (B66W01310).
   2. Two coats DTM Acrylic Semi-Gloss Coating (B66-200) @ 2.5-5.0 MDFTper coat.

G. Galvanized Metal: Exposed miscellaneous metal, exposed ducts, conduits, mechanical and electrical devices.
   1. One coat DTM Acrylic Primer/Finish (B66W1) @ 2.5-5.0 MDFT. (MPI #134)
   2. Two coats DTM Acrylic Semi-Gloss Coating (B66-200) @ 2.5-4.0 MDFT per coat. (MPI #153)

H. Aluminum - Mill Finish:
   1. Two coats DTM Acrylic Gloss Coating (B66-100) @ 2.5-4.0 MDFT per coat. (MPI #114)

I. Steel - Exposed steel lintels:
   1. One coat Pro Industrial Pro-Cryl PR of W (B66W01310).
   2. Two coats Pro Industrial WB ALK UR SG EW (B53W01151).
   3. Application: Preparation and prime coat is to be applied including previously primed in factory by steel fabricator.

J. Gypsum Board: Finish surfaces exposed to view.
   1. All interior drywall gypsum board wall surfaces for a painted finish. (Spot prime all areas containing joint compound with primer first)
      a. Primer: One coat Pro Mar 200 Zero VOC Primer (B28) DFT- 1.0. (MPI #50).
      b. Walls: Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
      c. Ceilings: Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
   2. Exception: All interior gypsum wallboard surfaces previously painted @ **Intermediate Library**. (Spot prime all areas containing joint compound with primer first)
      a. Primer:
         1) One coat Extreme Bond Primer (B51) DFT- 0.9.
      b. Walls: Two coats ScuffTuff (S-26) @ 1.2 MDFT per coat.
      c. Ceilings: Two coats ScuffTuff (S-26) @ 1.2 MDFT per coat.

K. Plaster: Finish surfaces exposed to view.
   1. All interior plastered wall surfaces for a painted finish. (Spot prime all areas containing raw plaster with primer first)
      a. Walls and ceilings: One coat Pro Mar 200 Zero VOC Primer (B28) DFT- 1.0. (MPI #50).
      b. Walls: Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT
      c. Ceilings: Two coats SuperPaint Air Purifying Technology (A86) @ 1.8 MDFT

L. New Wood Casework: See Section 06 41 00 - Architectural Wood Casework, for required factory finish.

M. New Wood Doors: Refer to appropriate door specification for required factory finish.

N. Wood (Existing) - Varnished:
   1. Two coats Minwax Performance Series Interior Wood Stain 250 VOC A 49 Series.
   2. Two coats Minwax Fast Dry Polyurethane (154-3453 Satin, 154-8890 Semi-Gloss, or 154-3479 Gloss finish.
   3. ** Number of coats dependent upon final inspection by architect/owner.

3.8 SCHEDULE - PAINT SYSTEMS: ALL MATERIALS ARE BASED ON PPG UNLESS NOTED OTHERWISE.

A. Concrete Block:
   1. One coat Speedhide Masonry Hi Fill Latex Block Filler, 6-15XI. (MPI #4)
   2. Two coats Copper Armor Interior Latex, 29-1510, Semi-Gloss.

B. Concrete:
   1. One coat Perma-Crete Interior/Exterior Alkali Resistant Primer, 4-603XI Series. (MPI #3)
   2. Two coats Pure Performance Interior Latex, 9-510XI Series, Semi-Gloss. (MPI #147)

C. Concrete Floors (Lt. - Med. Duty):
   1. One coat Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer Stain, 4-6200XI. (MPI #99)
   2. Two coats Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer Stain, 4-6200XI. (MPI #99)

D. Concrete Floors, Pigmented
   1. Two coats Aquapon WB Water Based Epoxy 98E-1 series @ 3.0 MDFT per coat.
   2. Tinted: See Finish Key

E. Steel and Metal - Steel access doors and frames, hollow metal doors and frames, all new removable mullions, stair railings, hollow metal Windows frames, existing painted fire extinguisher cabinets:
   1. One coat Multi-Prime Multi-Purpose Primer, 4160 Series. (MPI #79)
   2. Two coats Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610.

F. Galvanized Metal: Exposed miscellaneous metal, exposed ducts, conduits, mechanical and electrical devices.
   1. One coat Pitt-Tech Plus EP Acrylic Primer/Finish 90-1908.
   2. Two coats Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610.

G. Aluminum - Mill Finish:
   1. Two coats Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610.

H. Steel - Exposed steel lintels:
   1. One coat Multi-Prime Multi-Purpose Primer, 4160 Series. (MPI #79)
   2. Two coats Sil-Shield Silicone Alkyd Enamel High Gloss 95-5000 Series.

I. Gypsum Board: Finish surfaces exposed to view.
   1. All interior drywall gypsum board wall surfaces for a painted finish. (Spot prime all joints and spots with primer first)
      a. Walls and ceilings: Two coats Pure Performance Interior Latex Primer, 9-900.
      b. Walls: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)
      c. Ceilings: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)

J. Plaster: Finish surfaces exposed to view.
   1. Interior Walls and Ceilings: GI-OP-2LA.
   2. All interior plastered wall surfaces for a painted finish. (Spot prime all joints and spots with primer first)
      a. Walls and ceilings: Two coats Pure Performance Interior Latex Primer, 9-900.
      b. Walls: Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)
      c. Ceilings: Two coats Two coats Copper Armor Interior Latex, 29-1310, Eggshell. (MPI #144)

K. New Wood Casework: See Section 06 41 00 - Architectural Wood Casework, for required factory finish.

L. New Wood Doors: Refer to appropriate door specification for required factory finish.

3.9 SCHEDULE

A. Refer to Finish Key and Schedule on A9.1.

END OF SECTION

SECTION 09 93 00
STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of stains and transparent finishes.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 REFERENCE STANDARDS

A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category.
   2. MPI product number (e.g. MPI #33).
   3. Manufacturer's installation instructions.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit two samples, illustrating selected colors and sheens for each system with specified coats cascaded. Submit on actual wood substrate to be finished, __6__by__6__ inch in size.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Manufacturer's Qualification Statement.

F. Applicator's Qualification Statement.

G. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Stain and Transparent Finish Materials: 1 gallon of each color and type; from the same product run, store where directed.
   3. Label each container with color and type in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum ten years experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperature: 50 degrees F unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide finishes used in any individual system from the same manufacturer; no exceptions.

B. Transparent Finishes:
1. PPG Paints: www.ppgpaints.com/#sle.
2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

C. Stains:
1. PPG Paints: www.ppgpaints.com/#sle.
2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 STAINS AND TRANSPARENT FINISHES - GENERAL

A. Finishes:

1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. Supply each finish material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.

2.3 EXTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Wood:
1. Stain: Exterior Solid Stain for Wood, Water Based; MPI #16.
a. Products:
1) PPG Paints ProLuxe Premium Solid Wood Finish, SIK710 Series, Matte. (MPI #16)
2) Sherwin-Williams WoodScapes Acrylic Solid Color Stain. (MPI #16)
3) Substitutions: Section 01 60 00 - Product Requirements.
2. Stain: Exterior Semi-Transparent Stain for Wood, Water Based; MPI #156.
a. Products:
1) PPG Paints ProLuxe SRD Semi-Transparent Wood Finish, SIK500-190, Matte. (MPI #156)
2) Sherwin-Williams WoodScapes Polyurethane Semi-Transparent Stain.
3) Substitutions: Section 01 60 00 - Product Requirements.

2.4 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Wood - Vertical Surfaces:
1. Stain: Semi-Transparent Stain for Wood, Water Based; MPI #186.
a. Products:
1) PPG Paints Deft Interior Water-Based Wood Stain, DFT300 Series. (MPI #186)
2) Substitutions: Section 01 60 00 - Product Requirements.
2. Sealer: Water-Based, Sanding Sealer, Clear.
a. Products:
1) PPG Paints Deft Interior Water-Based Sanding Sealer, DFT61.
2) Substitutions: Section 01 60 00 - Product Requirements.
3. Sealer: Lacquer, Sanding Sealer, Clear; MPI #84.
a. Products:
1) PPG Paints Speedline High Build Clear Lacquer Sanding Sealer, 77-9100. (MPI #84)
2) Substitutions: Section 01 60 00 - Product Requirements.
4. Top Coat(s): Polyurethane Varnish, High Build.
a. Products:
1) Sherwin-Williams MinWax High Build Polyurethane, Satin.
2) Substitutions: Section 01 60 00 - Product Requirements.

5. Top Coat(s): Clear Water-Based Varnish; MPI #128, 129, or 130.
   a. Products:
      1) PPG Paints Deft Interior Polyurethane Water-Based Acrylic, DFT159, Satin. (MPI #128)
      2) PPG Paints Deft Interior/Exterior Water-Based Polyurethane, DFT259, Satin.
      3) Substitutions: Section 01 60 00 - Product Requirements.
6. Top Coat(s): Clear Lacquer; MPI #85, 86, or 87.
   a. Products:
      1) PPG Paints Speedline High Build Clear Lacquer, 77-9130, Satin. (MPI #85)
      2) PPG Paints Speedline High Build Clear Lacquer, Semi-Gloss, 77-9120.
      3) PPG Paints Speedline High Build Clear Lacquer, Gloss, 77-9110. (MPI #86)

2.5 ACCESSORY MATERIALS

A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin application of stains and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Sand wood surfaces lightly between coats to achieve required finish.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

G. Reinstall items removed prior to finishing.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.7 SCHEDULE

A. Refer to Finish Key and Schedules.

END OF SECTION

SECTION 10 11 00
VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Porcelain enamel steel markerboards.

B. Glass markerboards.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Blocking and supports.

B. Section 09 21 16 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

C. Section 09 91 23 - Interior Painting: Finishing of wood frame and marker rail.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.

C. ANSI A208.1 - American National Standard for Particleboard; 2016.

D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.

E. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.

F. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012 (Reapproved 2017).

G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.

H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

J. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.

K. PS 1 - Structural Plywood; 2009.

L. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.

D. Samples: Two, 2 by 2 inches in size illustrating materials and finish, color and texture of chalkboard, porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surfacing, and trim.

E. Maintenance Data: Include data on regular cleaning, and stain removal .

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for chalkboard and markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle.

B. Polyvision Corporation: www.polyvision.com/#sle.

2.2 VISUAL DISPLAY UNITS

A. Porcelain Enamel Steel Markerboards:
1. Color: As selected from manufacturer's full range.
2. Size: As indicated on drawings.
3. Frame: Extruded aluminum, with concealed fasteners.
4. Frame Profile: 1 1/2" wide perimeter trim
5. Frame Finish: Anodized, natural.
6. Accessories: Provide map rail, flag holder, and cleaning instruction plate.
7. Chalk Tray: Chalktrough with end closures.

B. Magnetic Glass Markerboards: Back-coated glass, laminated to steel.
1. Glass: Laminated, low iron, 1/4 inch thick, with bevel edges and radiused corners, laminated to steel backing sheet for use with magnets. Coated or treated for use as dry erase board or projection surface.
2. Glass Finish: White coating.
3. Steel Backing Sheet Thickness: 24 gauge, 0.0239 inch .
4. Frame: Same as for porcelain enamel steel markerboards.
5. Mounting: Concealed Z clips.
6. Accessories: Provide magnetic marker tray and magnetic marker holder.

C. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
2. Configuration: As indicated on drawings.

2.3 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.

B. Float Glass: Provide float-glass-based glazing unless otherwise indicated.

C. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Comply with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

D. Vinyl Coated Fabric: ASTM F793/F793M Category VI.

E. Adhesives: Type used by manufacturer.

2.4 ACCESSORIES

A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.

B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.

C. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

D. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board.

E. Cleaning Instruction Plate: Provide instructions for chalkboard cleaning on a metal plate fastened to perimeter frame near chalkrail.

F. Chalk/Marker Tray: Aluminum, manufacturer's standard extruded profile closed ends; concealed fasteners, same finish as frame.

G. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.2 INSTALLATION

A. Install boards in accordance with manufacturer's instructions.

B. Secure units level and plumb.

3.3 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Room and door signs.

B. Emergency evacuation maps.

C. Fabricated Dimensional Letters

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

D. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

E. NFPA 101-2018 - Life Safety Code; 2018.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, location, layout, profiles, product components, including anchorage and accessories and overall dimensions of each sign.

C. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign. Include test data for fire rating for each sign type specified.

D. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
   1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
   2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
   3. Submit for approval by Owner through Architect prior to fabrication.

E. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

F. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips. Include colors, background, and graphic options.

G. Verification Samples: Submit samples showing colors specified, or selected.

H. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

I. Manufacturer's Qualification Statement.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning material and methods.
      a. See Section 01 60 00 - Product Requirements, for additional provisions.

1.4 QUALITY ASSURANCE

A. Supplier: Obtain all products in this section from a single supplier.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package signs as required to prevent damage before installation.

C. Package room and door signs in sequential order of installation, labeled by floor or building.

D. Store tape adhesive at normal room temperature.

1.6 FIELD CONDITIONS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install signs when ambient temperature is lower than recommended by manufacturer.

C. Maintain this minimum temperature during and after installation of signs.

1.7 WARRANTY

A. Provide manufacturer's standard warranty for a period of one year covering delamination, discoloration, fading, document executed by authorized company official.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Flat Signs:
   1. ASI Sign Systems, Inc.; InForm - FR (Basis of Design): www.asisignage.com
   2. ID Signsystems: Schola Series, www.idsignsystems.com.
   3. Or Approved Equal.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with co-molded panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. Character Height: 5/8 inch, minimum; 2 inch maximum, unless noted otherwise.
   4. Sign Height: 2 inches, unless otherwise indicated.
   5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
   6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
   7. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
   8. Rest Rooms: Identify with pictogram, the names as indicated on room finish schedule located on drawings, and braille.

C. Emergency Evacuation Maps:
   1. Sign Type: Same as room and door signs with clear cover for updateable customer produced sign media.
   2. Allow for one map per elevator lobby.
   3. Map content to be provided by Owner.

D. Other Dimensional Letter Signs: Wall-mounted.
   1. Interior: Allow for total of 35 letters, 6 inches high, metal.

2.3 SIGN TYPES

A. Flat Signs: Signage media without frame.
   1. Edges: Square.
   2. Corners: Square.
   3. Clear Cover: For updateable customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
   4. Wall Mounting of One-Sided Signs: Tape adhesive.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Helvetica, Arial or ADA recommended sans serif font.
   2. Character Case: Upper case only.
   3. Background Color: Clear.
   4. Character Color: Contrasting color.

2.4 TACTILE SIGNAGE MEDIA

A. Co-Molded Panels: Extruded Engineered Clear Polycarbonate Class A fire rated when tested in accordance with ASTM E84.
   1. Tactile Graphics and Text: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque surface using manufacturer’s co-molding process. Applied or engraved characters shall not be acceptable.
      a. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.

b. Text Colors: As selected from manufacturer's standard colors.
2. Background Colors: High contrast subsurface paint, as selected from manufacturer's standard colors.
3. Surface Texture: Matte.
4. Total Thickness: 1/8 inch.

2.5 DIMENSIONAL LETTERS

A. Metal Letters:
1. Metal: Aluminum casting.
a. Cast free from pits, gas holes, and warped surfaces.
2. Metal Thickness: 1/8 inch minimum.
3. Letter Height: 6 inches.
4. Text and Typeface:
a. Character Font: Helvetica, Arial, or other sans serif font.
b. Character Case: Upper case only.
5. Finish: Brushed, satin.
6. Product: Basis of Design: ASI LPS Series Cut Metal Dimensional Letters.
7. Mounting: Concealed screws.

2.6 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Mounting Accessories
1. Interior Signs:
a. Tape Adhesive: Double sided vinyl tape and silicone, permanent adhesive.
2. Cast Aluminum Letters:
a. 13/16 inch aluminum stud with silicone sealant.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that substrate surfaces are ready to receive work.

C. Scheduling of installation by Owner or Owner's representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions, after doors and surfaces are finished, in locations scheduled.

B. Install product level, plumb and heights indicated.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Install product with mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:
   1. Interior Signs:
      a. At 54 inches high to the centerline of sign.
      b. On the latch side of the door.
      c. At the right side of double doors.
      d. Provide 18 inch floor clearance, centered on tactile characters.
      e. Within 1/4 inch vertically and horizontally of intended locations.
   2. Interior Four-Sided Signs and Interior 3-dimensional Signs:
      a. Coordinate exact location with Architect prior to installation.
   3. Exterior Signs:
      a. At 54" high to the center of sign
      b. Within 12" horizontally from the latch side of the door.
      c. At the right side of double doors.
      d. Mount signs at each end of a row of doors up to 12 feet in length.
      e. Install intermediate sign at rows of doors as to not exceed 12 feet between signs.
      f. Within 1 inch vertically and horizontally of intended location.
      g. Coordinate exact location with Architect prior to installation.
   4. Cast Letters:
      a. Mount as directed on Drawings.
   5. Fabricated Letters:
      a. Mount as directed on Drawings.

F. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

3.3 CLEANING, PROTECTION AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet interior and 10 feet exterior.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

C. Dispose of construction debris.

3.4 SCHEDULE

A. Refer to Signage Schedule, Signage Type Schedule and Drawings for sizes, locations and layout of signage types, sign text copy and graphics.

END OF SECTION

SECTION 10 21 13.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal screens.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Concealed steel support members.

B. Section 06 10 00 - Rough Carpentry: Blocking and supports.

C. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

1.3 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

B. ANSI A117.1 - America National Standard- Accessible and Usable Buildings and Facilities.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall, floor, and ceiling supports, door swings.

C. Samples: Submit two samples of partition panels, 4 by 4 inch in size illustrating panel finish, color, and sheen.

D. Manufacturer's Installation Instructions: Indicate special procedures.

1.6 WARRANTY

A. Manufacturer to supply a written warranty covering all components against breakage corrosion and delamination for a period of 1 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. All American Metal Corp - AAMCO: www.allamericanmetal.com/#sle.
   2. ASI Global Partitions: www.asi-globalpartitions.com/#sle.

3. Metpar Corp: www.metpar.com/#sle.
4. Scranton Products (Santana/Comtec/Capital): www.scrantonproducts.com/#sle.
5. Substitutions: Section 01 60 00 - Product Requirements.

2.2 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with ASTM E84; floor-mounted headrail-braced.
   1. Color: Single color as selected.

B. Doors:
   1. Thickness: 1 inch.
   2. Width: 24 inch.
   3. Width for Handicapped Use: 36 inch, out-swinging.
   4. Height: 55 inch.

C. Panels:
   1. Thickness: 1 inch.
   2. Height: 55 inch.

D. Pilasters:
   1. Thickness: 1 inch.
   2. Width: As required to fit space; minimum 3 inch.

E. Screens: Without doors; to match compartments; mounted to wall with two panel brackets.
   1. Panel bottom not more than 6" above finished floor.
   2. Panel top not less than 60" above finished floor.
   3. Panel depth not less than 18" or less than 6" beyond the outermost front lip of urinal, whichever is greater.

2.3 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Head Rails: Extruded aluminum, anti-grip profile.

C. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
   1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

D. Door Hardware: Stainless steel, manufacturer's standard finish.
   1. Door Latch: Slide type with exterior emergency access feature.

E. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 21 23
CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface mounted overhead curtain track and guides.

B. Cubicle curtains.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Track supports above ceiling.

B. Section 06 10 00 - Rough Carpentry: Blocking and supports for track.

C. Section 09 51 00 - Acoustical Ceilings: Suspended ceiling system to support track.

1.3 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for curtain fabric characteristics and track.

C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.

D. Samples: Submit two fabric samples, 12 by 12 inch in size illustrating fabric color.

E. Samples: Submit 12 by 12 inch sample patch of curtain cloth with representative top, bottom, and edge hem stitch detail, heading with reinforcement and carrier attachment to curtain header.

F. Samples: Submit 12 inch sample length of curtain track including typical splice, wall and ceiling hanger, and escutcheon.

G. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Curtains: Two of each type and size.

1.5 MOCK-UP

A. Provide cubicle track and curtain mock-up, 8 feet long by 8 feet wide, with curtain track, curtain, cords and accessories.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept curtain materials on site and inspect for damage.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cubicle Track and Curtains:
1. C/S General Cubicle: www.c-sgroup.com/cubicle-track-curtains/#sle.
2. Imperial Fastener Co., Inc: www.imperialfastener.com/#sle.
3. Inpro: www.inprocorp.com/#sle.
4. On the Right Track Systems, Inc.:www.ontherighttrack.com
5. Carnegie Fabrics; https://carnegiefabrics.com/
6. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TRACKS AND TRACK COMPONENTS

A. Tracks: Extruded aluminum sections; one piece per track run.
1. Profile: Channel.
2. Mounting: Surface.
3. Structural Performance: Capable of supporting vertical test load of 50 lbs without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
4. Track End Stop: To fit track section.
5. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
6. Suspension Rods: Tubular aluminum sections, sized to support design loads and designed to receive attachment from track and ceiling support.
7. Escutcheons: Where suspension rod meets finished ceiling or structure, provide escutcheons to match rod finish.
8. Finish on Exposed Surfaces: White enamel.
9. Products:
a. American Track Supply; Aluminum Track: www.americantracksupply.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.

C. Wand: Plastic, attached to lead carrier, for pull-to-close action.

D. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.3 CURTAINS

A. Cubicle Curtains:

1. Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
2. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
3. Material: Close weave polyester; anti-bacterial, self deodorizing, sanitized, and preshrunk.
4. Color/Pattern: As indicated on drawings.
5. Basis of Design: Carnegie Fabrics; https://carnegiefabrics.com/ or Equal

B. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.

C. Attachment of Curtain Fabric to Open Mesh Cloth: Manufacturer's standard sewn seam.

D. Curtain Fabrication:
1. Width of curtain to be 10 percent wider than track length.
2. Length of curtain to end 15 inches above finished floor.
3. Pattern match fabric with vertical seams.
4. Include open mesh cloth at top 20 inches of curtain for room air circulation, attached to curtain as specified above.
5. Curtain Heading: Fabric band matching curtain panel with metal grommet holes for carriers spaced 6 inches on center.
6. Seams and Hems: Manufacturer's standard fabrication method for securely sewn and finished seams and hems.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that surfaces and supports above ceiling are ready to receive work of this Section.

C. Verify that field measurements are as indicated.

3.2 INSTALLATION

A. Install curtain track to be secure, rigid, and true to ceiling line.

B. Secure track to ceiling system.

C. Install end cap and stop device.

D. Install curtains on carriers ensuring smooth operation.

3.3 SCHEDULES

A. Refer to Finish Key & Schedules.

END OF SECTION

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial toilet accessories.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Placement of concealed wood blocking and backing plates for support of accessories.

B. Section 09 30 00 - Tiling: Ceramic washroom accessories.

C. Section 10 21 13.19 - Plastic Toilet Compartments.

1.3 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

E. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.

F. ASTM C1036 - Standard Specification for Flat Glass; 2016.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

H. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Samples: Submit two samples of each accessory, illustrating color and finish.

D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. American Specialties, Inc (ASI): www.americanspecialties.com.
   2. Bobrick Washroom Equipment, Inc.: www.bobrick.com
   3. Bradley Corporation: www.bradleycorp.com/#sle.
   4. Substitutions: Section 01 60 00 - Product Requirements.

B. Provide products of each category type by single manufacturer.

2.2 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

B. Keys: Provide access keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 COMMERCIAL TOILET ACCESSORIES

A. Waste Receptacle: Stainless steel, freestanding style with swing top.
   1. Liner: Removable seamless stainless steel receptacle.
   2. Minimum capacity: 13 gallons.

B. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.
   1. Minimum Capacity: 48 ounces.

C. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.

D. Combination Sanitary Napkin/Tampon Dispenser: Stainless steel, surface-mounted.
   1. Door: Seamless 0.05 inch door with returned edges and tumbler lock.
   2. Cabinet: Fully welded, 0.03 inch thick sheet.
   3. Operation: No charge; no coin slots.
   4. Identify dispensers slots without using brand names.
   5. Minimum capacity: 15 napkins and 20 tampons.

E. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

D. See Section 06 10 00 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

END OF SECTION

SECTION 01 10 100
INSTRUCTIONS TO PROPOSERS
DIGITAL SITE SIGNAGE

PART 1 COMPETITION PROCESS

1.1 PROJECT SCHEDULE

A. See Section 01 32 00 – Construction Schedules, Phasing & Site Logistics.

B. Attendance at pre-proposal briefings and site tours is mandatory.

1.2 REQUEST FOR QUALIFICATIONS

A. The Request for Qualifications documents consist of:
   1. The Request for Qualifications.
   2. The Instructions to Proposers.
   3. The Summary Project Description, including:
      a. Site Description.
      b. Program Narrative.
      c. Building Area Summary.
      d. Preliminary Project Budget.
      e. Summary of Agreement and Contract terms.

B. Qualifications Statement Submission: Date as indicated in schedule above.
   1. Location: Email to Joshua Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 Digital Copy

C. Acceptance and Rejection: Owner reserves the right to pre-qualify or reject proposers as unqualified, including without limitation the right to reject nonconforming, nonresponsive, unbalanced, or conditional qualifications. Owner reserves the right to reject the qualifications of any proposer if Owner believes that it would not be in the best interest of the project to make an award to that proposer, whether because the proposer is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner.

1.3 REQUEST FOR PROPOSALS

A. Qualified Proposers: Only those proposers already pre-qualified may receive the Proposal Documents or submit proposals. The individuals or entities that will be providing design professional services must be the same as those listed in the previously accepted qualifications.

B. The RFP Documents will consist of:
   1. The Request for Proposal, including:
      a. Project Information.
      b. The Instructions to Proposers.
      c. The Proposal Form.
      d. The Agreement and Conditions of the Contract and Contract Definitions.
      e. Sample contract forms.
   2. The Contract Documents, including:
      a. The Drawings.
      b. The Specifications.

C. Pre-Proposal Briefing(s): Date: Coordinate with Construction Manager for site visits at lee.stepp@lechase.com

D. Proposal Submission: by January 27th at 4PM.
   1. Location: Email Proposal to Josh Bezio at HUNT Engineers, Architects, Surveyors at bezioj@hunt-eas.com and copy Lee Stepp at LeChase lee.stepp@lechase.com
   2. Number of Copies: 1 digital copy via email
      a. 1 hard copy with company seal mailed for record to:
      Homer Central School District
      Attn: Michael Falls - Assistant Superintendent for Management
      PO Box 500
      Homer, New York 13077

E. Proposal Security: Each proposal must be accompanied by proposal security as described in Section 00 51 00 – Performance Bond and Labor and Material Payment Bond (AIA Document A312).

F. Proposals will be opened privately.

G. Acceptance, Award, And Rejection: All proposals will remain subject to acceptance for the time period indicated in Section 00 52 14 – Standard Form of Agreement & Insurance (AIA Document A132), but Owner may, at its sole discretion, release any proposal prior to that date.

H. Execution Of Agreement: When the Owner gives a Notice of Award to the successful proposer, the proposer will be expected to execute the Agreement within 15 days thereafter and deliver the required contract security.

1.4 The Site Signage Contractor shall be responsible for all Digital Site Signage work shown on the Landscape (L) Drawings, unless noted otherwise, and any site signage work shown on all other drawings and further defined below:

A. Division 10 – Specialties

   1. Specification Section 10 15 00 – Video Display Systems

      a. Provide all components and accessories, foundations, and specifications including installation.

      b. Electrical and data connections by Electrical Contract.

      c. Site Work Contractor will provide trenching, excavation, backfill and site restoration for site signage and associated utilities.

   2. Furnish and install all labor, material, supervision, equipment, scaffolding, layout, engineering, deliveries, trucking, hoisting, rigging, shop drawings, submittals, and all other items related and required to complete all Digital Site Signage Work in accordance with Contract Documents and all applicable codes having jurisdiction.

   3. The Contractor represents they have expertise in the performance of Work for this trade and assures all items to be complete, functional and installed in accordance with the best practices consistent with premium quality material and workmanship.

PART 2 EVALUATION

2.1 THE EVALUATORS

A. Evaluation and recommendation will be made by the Owner, and the Owner's project team.

B. Owner may conduct such other investigations as Owner deems necessary to assist in the evaluation of any proposal and to establish the responsibility, qualifications, and financial ability of proposers, proposed design professionals, subcontractors, suppliers, and other individuals and entities to perform the work in accordance with Contract Documents.

2.2 SELECTION CRITERIA

A. Basis of Selection: The successful proposal will be the one that provides the best value to the Owner, based on the price after correction for greater or lesser quality and/or shorter or longer time ("adjusted low bid"), with Contract Amount based on Proposal price, as well as exceptional qualifications.

B. Proposal Exhibits: Submit drawings, specifications, and other data as indicated on the Proposal Form of form and character sufficient to adequately explain the design intent and the character of the proposed construction; incorporate into the exhibits substantiation specified in the Performance Specifications as to be submitted for the Proposal.

C. Qualifications Criteria: To demonstrate qualifications to perform the work, each proposer must submit written evidence, as called for below.
   1. The individuals or entities that will be providing design professional services must be listed in the Proposal.
   2. See Conditions of the Contract for contract conditions that may affect personnel provided.

PART 3 TERMS AND PROCEDURES

3.1 COPIES OF DOCUMENTS

A. Complete sets of Proposal Documents must be used in preparing proposals. Neither the Owner nor any consultant of the Owner who might have been involved in the preparation of the Proposal Documents assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

B. Proposal Documents will not be issued directly to Sub-proposers unless specifically indicated.

C. The Owner makes copies of the Proposal Documents available on the above terms only for the purpose of obtaining proposals for the work and does not confer any license or grant for any other use.

3.2 QUESTIONS

A. All questions prior to proposal must be received by the close of business on January 13, 2023. Questions shall be directed to Josh Bezio at HUNT Engineers, Architects, Surveyors at email bezioj@hunt-eas.com Copy all RFI's to Lee Stepp at LeChase at email lee.stepp@lechase.com. All proposers request for information shall use the form located in specification 00 85 20 – Project Forms & Documents. A digital copy of this form is available upon request.

B. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda faxed or emailed to parties recorded by Owner as having received the Proposal Documents.

C. Proposers may arrange for courier delivery at their own expense.

D. Only questions answered by formal written Addenda will be binding; oral and other interpretations or clarifications will be without legal effect.

E. Addenda may also be issued to modify the Proposal Documents as deemed advisable by the Owner.

3.3 BRIEFINGS

A. Representatives of the Owner will be present to discuss the project.

B. Owner will transmit to prospective proposers of record such Addenda as Owner considers necessary in response to questions arising at the conference.

C. Oral statements made at briefings may not be relied upon and will not be binding or legally effective.

3.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

A. It is the responsibility of each proposer, before submitting a proposal, to:

B. Examine the Proposal and Contract Documents thoroughly.

C. Visit the site to become familiar with and satisfy the proposer as to the general, local, and site conditions that may affect cost, progress, or performance of the work.

D. Consider federal, state, and local laws and regulations that may affect cost, progress, and performance of the work.

E. Study and carefully correlate the proposer's knowledge and observations with the Proposal Documents and other related data.

F. Promptly notify the Owner of conflicts, errors, ambiguities, and discrepancies which the proposer has discovered in the Proposal Documents.

3.5 INFORMATION RELATING TO EXISTING CONDITIONS

A. The Owner has identified certain reports and/or tests, which have been utilized by the Owner in preparation of the Proposal Documents.

B. The proposer may rely on the general accuracy of the technical data contained in such reports but not upon other data, interpretations, or opinions contained in such reports, not upon the completeness thereof for the purposes of preparing its proposal, for design, or for construction.

C. Where such reports are not included in the Proposal Documents, copies will be made available by Owner to any proposer on written request.

D. These reports are not part of Contract Documents; the proposer is responsible for any interpretation or conclusion drawn from such reports.

3.6 SUPPLEMENTARY INVESTIGATIONS

A. Before submitting a proposal each proposer will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, or data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise, which may affect cost, progress, or performance of the work, or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by the proposer and safety precautions and programs incident thereto, or which the proposer deems necessary to prepare its proposal for performing the work in accordance with the time, price, and other terms and conditions of Contract Documents.

3.7 WORK AT SITE BY OTHERS

A. See Section 01 10 00 – General Summary of Work and Sections 01 10 10 – General Summary of Work, 01 10 20 – General Construction (GC), 01 10 30 – Plumbing (PC), 01 10 40 – Mechanical (MC / HVAC), 01 10 50 – Site Work (SC) for identification of the general nature of work that is to be performed at the site by Owner or others (such as utility companies & Prime Contractors) that relates to the work for which a proposal is to be submitted.

B. On request, Owner will provide the proposer access to or copies of Contract Documents for such work (other than portions thereof related to price).

3.8 TAXES

A. Owner is exempt from State sales and use taxes on materials and equipment to be incorporated into the work.

B. Do not include said taxes in the Contract Price.

C. See Conditions of the Contract for additional information.

3.9 CONTRACT TIME

A. The time within which the work is to be completed will be incorporated into the Agreement.

B. The apparent successful proposer will be required to satisfy Owner that it will be able to achieve Substantial Completion and final completion within the designated times.

3.10 QUALIFICATION STATEMENT

A. Contractor's Qualification Statement:
   1. Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for the Proposal.
   2. A copy of Contractor's Qualification Statement - AIA Document A305 is included for reference.

B. Materials larger than 8-1/2 by 11 inches will not be accepted.

C. References: Maximum of 20, verified, with contact name, phone number, and fax number; notify contact person that Owner may request information.

D. Resumes: Maximum of 10 persons; maximum of 2 pages each.

E. Slides: Submit in plastic slide holders punched for 3-ring binder, for viewing without removal from holder.

F. Standard printed brochures are preferable to custom-prepared graphics.

3.11 PROPOSAL FORM

A. Proposal Form: The Proposal Form is included in the Proposal Documents; additional copies may be obtained from the Owner.

B. Fill in blanks on the Proposal Form electronically.
   1. In addition to signatures, enter names electronically.
   2. Show address, telephone number, fax number, and email address for communications regarding the proposal.
   3. Sums shall be expressed in both words and numbers. In case of discrepancy, the amount entered in words shall govern.
   4. All requested Alternates shall be proposed. If no change in the Base Proposal, enter "No Change" in the proposal form.

C. Execute Proposals by partnerships in the partnership name; signed by a partner, whose title must appear under the signature.
   1. Show the official address of the partnership below the signature.

D. Execute Proposals by corporations in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign); affix corporate seal and indicate it has been attested by the secretary or an assistant secretary.
   1. Show corporate address and state of incorporation below the signature.
   2. Attach evidence of authority to conduct business in the state where the work is to be performed If the proposer is an out-of-state corporation.

E. Include an acknowledgement of receipt of issued Addenda on the Proposal Form, including their numbers and dates.

3.12 PROPOSAL EXHIBITS

A. Materials submitted will become the property of the Owner.

B. Owner reserves the right to publish or display publicly submitted exhibits.

3.13 PROPOSAL SUBMISSION

A. Enclose Proposals in an opaque sealed envelope or box, marked with the project title and the designated portion of the project for which it is submitted and the name and address of the proposer.

B. Seal the price proposal in a separate envelope marked "DIGITAL SITE SIGNAGE PRICE PROPOSAL."

C. If the submission is sent through the mail or other delivery system, enclose the sealed envelope or box in a separate envelope or container marked "QUALIFICATIONS ENCLOSED" or "DIGITAL SITE SIGNAGE PROPOSAL ENCLOSED" (as applicable).

D. Include Exhibits indicated on the Proposal Form in the same envelope or box; clearly identify each separate item with the proposer's name and project name.

3.14 PROPOSAL SECURITY

A. Proposal security must be in the form of a certified or cashier's check.

B. The proposal security of the successful proposer will be retained until such proposer has executed the Agreement, furnished any required contract security, and met the other conditions of the Notice of Award, whereupon the proposal security will be returned.

C. If the successful proposer fails to execute and deliver the Agreement and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the proposal security of that proposer will be forfeited.

D. The proposal security of proposers whose proposal is not considered competitive will be returned within 7 days after the proposal opening.

3.15 DISQUALIFICATION

A. Any proposer may be disqualified due to breach of proposal procedures, modification of proposal after submission, or withdrawal of proposal after submission.

B. Disqualification will result in forfeiture of proposal security.

3.16 SUBMITTALS

A. After notification of selection for the award of the Contract, the Proposer shall, as soon as practicable or as stipulated in the Contract Documents, submit in writing to the Owner through the Construction Manager & Architect via Procore & Newforma:
   1. a designation of the Work to be performed with the Proposer’s own forces;
   2. names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
   3. names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
   4. a Schedule of Values broken down by Specification Section for all portions of the work, unless otherwise noted in Section 01 29 00 – Payment Procedures.

B. The Proposer will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work

described in the Contract Documents.

C. Prior to the execution of the Contract, the Architect will notify the Proposer if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may, at the Proposer's option, withdraw the Proposal or submit an acceptable substitute person or entity. The Proposer may also submit any required adjustment in the Base Proposal or Alternate Proposal to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted proposal price or disqualify the Proposer.

D. Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

3.17 PERFORMANCE BOND AND PAYMENT BOND

A. Bond Requirements:
   1. As stipulated in the Contract Documents, the Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.
   2. As the furnishing of such bonds is stipulated in the Contract Documents, the cost shall be included in the Proposal. If the furnishing of such bonds is required after receipt of proposals and before execution of the Contract, the cost of such bonds shall be added to the Proposal in determining the Contract Sum.
   3. The Proposer shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The surety company shall be listed in the latest issue of the U.S. Treasury Circular 570.
   4. Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

B. Time of Delivery and Form of Bonds
   1. The Proposer shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract.
   2. Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.
   3. The bonds shall be dated on or after the date of the Contract.
   4. The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.
   5. bond a certified and current copy of the power of attorney.

3.18 EXECUTION OF AGREEMENT

A. Notice of Award will be accompanied by required number of unsigned copies of the Agreement with other written Contract Documents attached.

B. Digital Site Signage Contractor is required to sign and deliver the required number of copies of the Agreement and attached documents to Owner with the required contract security.

C. Within 15 days thereafter Owner will deliver one fully signed copy to the Digital Site Signage Contractor.

D. The Conditions of the Contract set forth the Owner's requirements as to performance and payment bonds or other contract security. When the successful proposer delivers the executed Agreement to Owner, it must be accompanied by the required contract security.

END OF SECTION

SECTION 11 40 00
FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.2 SUMMARY

A. Supply, deliver and set in place all food service equipment at identified locations, and level before and after final connections by others.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by Contract Documents. Substitutions require approval by Architect for use or implementation.
   1. Substitutions provisions are handled under Division 01 Section.

1.4 REFERENCES

A. All Food Service Equipment provided and installed must comply with below agencies, state department of health and county or local laws and ordinance.

B. American Society for Testing Materials (ASTM):
1. ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
2. ASTM A446, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
3. ASTM C1036, Specification for Flat Glass.
4. ASTM C1048, Specification for Heat Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.

C. American Welding Society (AWS).

D. National Electrical Manufacturers Association (NEMA).

E. National Fire Protection Association (NFPA 96).

F. National Sanitation Foundation (NSF).

G. Underwriters Laboratories Listing (UL).

1.5 SUBMITTALS

A. Within sixty (60) days after award of contract (before equipment is purchased) the flowing shall be submitted in accordance with Section 01 33 00 SUBMITAL PROCEDURES. It shall be the responsibility of the GC (General Contractor) to confirm construction schedule with Architect and adjust the submittal process to accommodate any fast track project.
1. The submittal package will include the following: Product data book (cut sheet book) this product data book should account for all item numbers in this contract up to and including spare numbers and existing equipment. Product data cut sheets shall be marked up in a way that indicates model and accessories included with the item.
2. Submittal drawings will consist of the following: Custom shop drawings (hoods, walk-ins, millwork, serving lines custom fabrication, etc.) Equipment layout drawings, Plumbing connection drawings, electrical connection drawings, HVAC layout drawings and Special condition drawings (Wall backing, floor depressions, etc.)
3. All submittal packages shall be at least 98% complete at submission, unless pre-approved by Architect and the Food Service Consultant

B. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations

from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.

C. Drawing of fabricated equipment shall not be less than ¾" equal one-foot scale.

D. Rough-in drawings shall not be less than ¼" equal one-foot scale.

E. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.

F. Samples: Submit samples of stainless steel and other finish materials for color selection.

G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

H. Manufacturer's Certificate: Certify that exhaust system and tests meet or exceed specified requirements.

I. It shall be the GC responsibility to coordinate all color selections that are not already selected with Architect. Any color selections stated in written specifications shall be confirmed by the GC with Architect prior to ordering.

1.6 CLOSEOUT SUBMITTALS

A. Within thirty (30) days after completion of contract the following shall be submitted.
   1. Operation and Maintenance Data:
      a. Operation Data: Provide manuals with a sequence of operation and utility connection diagram explaining system operation and corresponding to actual devices. After approval, submit 2 sets of three ring binders and an electronic copy.
      b. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.
      c. Within this manual Provide serial numbers on all equipment including walk in boxes and refrigeration when manual covers more than one model, indicate model provided
   2. Warranty letter by the GC (General Contractor) stating date of completion of installation for warranty issues.
   3. Demonstration sign in sheet listing what was demonstrated and all parties that attended this demonstration
   4. Equipment keys and spare parts list to include what was turned over and to whom.
   5. Signed by owner or owner's representative the punch list determining that all punch list items have been completed and to the owner's satisfaction.
   6. Provide documentation on all cooking equipment startups performed by an authorized service agent.
   7. Documentation of startups by authorized service agent

8. Provide copy of Ansul tag and testing

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Conform to applicable State and local codes for utility requirements.
   2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.

B. Energy Ratings: Provide appliances with energy guide labels with energy cost analysis (annual operating costs) and efficiency information as required by Federal Trade Commission.
   1. Provide all appliances that are Energy Star Rated.

1.8 QUALIFICATIONS

A. Installer: Must have a minimum of 5 years documented installation experience with projects similar to this project.

B. Fabricator: Must specialize in manufacture of commercial food services equipment with minimum 5 years documented experience.

C. Manufacturer: Must specialize in manufacturing products specified in this section with a minimum of 5 years documented equipment manufacturing experience.

D. One qualified full-time site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.
   1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant.

1.9 DELIVERY, STORAGE AND HANDLING

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of equipment installation.

C. Coordinate equipment delivery and installation with all other trades.

D. Contractor takes all responsibility for equipment damage incurred before, during and after installation, until Substantial Completion has been determined by Architect.

E. One site superintendent all be satisfactory to the Owner and Architect in all respects, and owner shall have the right to require Contractor to dismiss from the project any superintendent whose performance is not satisfactory to Owner and Architect except with another superintendent satisfactory to the Owner and Architect in all respects. At the request of the Architect, the Contractor's superintendent shall attend project meetings, whether the project meetings are prior to the start of the Contractor's work.
   1. Contractor shall provide a superintendent with experience in managing project of this size and complexity with minimum three (3) projects including projects completed on time per contract. Experience shall be documents in writing from end user and design consultant.

1.10 COORDINATION

A. Coordinate existing equipment with Owner per Part 3 Existing Equipment.

B. Coordinate with other trades to ensure existing equipment is disconnected prior to removal by this contractor. Supply and install all necessary drain traps, steam traps, vents, shut-offs, valves, pipe fittings, and/or other materials to complete final plumbing and electrical or steam connections between the rough-in and the connection or connections on each piece of equipment.

C. Ductwork and ductwork connections from hoods unless otherwise indicated.

D. Install all drain fittings, tailpieces, faucets, operating switches, and/or starters.

E. Coordinate sequencing of equipment installation with other trades prior to installing any piece of equipment.

F. Coordinate special conditions with other trades, i.e. floor depression, soda line conduit requirements, roof curbs, control wiring, etc.

1.11 WARRANTY

A. Provide a one (1) year parts and labor guarantee on all new equipment.

B. Components of equipment subject to replacement prior to one year's use and those items which may fail due to improper or inadequate periodic maintenance by the Owner/Operator are not intended to be included within the scope of warranty.

C. For all equipment that has refrigeration systems and semi-hermetic compressors, furnish an additional four (4) year warranty on all compressors.

D. Guarantee/Warranty period shall commence with the date of Substantial Completion.

E. Warranty includes all costs incurred for removal and re-installation of the replacement component or equipment.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. All products shall be new. Use salvaged materials only where specifically directed to do so.
   3. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   5. Where products require color selection the Architect will make the selection.
   6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
   7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:
   1. Products:
      a. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
   2. Manufacturers:
   3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

2.3 MATERIALS

A. Sheet Steel: ASTM A446; 1.25 ounce per square foot galvanized coating.

B. Stainless Steel: ASTM A167; Type 304 commercial grade, No. 4 finish.

C. Glass: 3/16-inch float conforming to ASTM C1036 and ASTM C1048; exposed edges ground; cut or drilled to receive hardware.

D. Plastic Laminate: NEMA LD3; 0.050-inch-thick; color as selected by Architect.

E. Laminate Backing Sheets: LD3-BK20, 0.020-inch-thick, unfinished plastic laminate.

F. Finish Hardware: Manufacturer's standard.

G. Work Surfaces: As specified.

H. Fittings: Sink drains with crumb cup and waste fittings, faucets, and electrical outlets.

I. Service Outlet Covers and Escutcheons: Stainless steel.

J. Service Accessories and Connections:
1. Provide control switch or starter on each motor-driven appliance or heating element, under provisions of UL requirements.
2. Provide internal wiring for equipment, including electrical devices, wiring controls, and switches to a common junction box.
3. Provide suitable length of 4 wire cord with plugs to match building receptacles.
4. Provide lamps for fixtures in equipment.
5. Provide equipment with connection terminals, so that connections of plumbing, gas, steam, electrical, ventilation, and refrigeration services can be made. Where receptacles are specified for custom equipment, supply cut-outs and outlet boxes set in place accessible for connections of electrical work.

2.4 EQUIPMENT

A. Provide rough-in hardware, supports and connections, attachment devices, closure panels, trim strips, and all accessories required for proper operation of equipment.

B. Standard of Comparison: The specified equipment has been established to set a standard of quality and features.

C. If substitutions require different utility/building conditions, electrical, plumbing, ventilation, etc., from those specified, a complete list of those changes for each item shall be included with the request for substitution. Any costs associated with these changes will become the responsibility of this Contractor.

D. Verify direction of door swings.

2.5 FABRICATION

A. General Requirements:
1. Stainless Steel Fastenings and Fittings: Bolts and screws with countersunk flat heads at interior and exterior visible or accessible surfaces. Use concealed fastenings where possible
2. Form edges smooth. Fabricate sheet material for work surfaces, facings, shelves, and drainboards of straight length in one continuous sheet when not over 12 feet in length.
3. Fix leg-mounted units by dowelling to floor with 1/4-inch stainless steel pins, where vibration or oscillation is anticipated.
4. Provide legs with stainless steel adjustable feet. Fasten legs to equipment securely and rigidly.
5. Install rubber or nylon button feet or other protective device on bearing surface of any item positioned on a finished surface.
6. Isolate rotating or reciprocating machinery to prevent noise and vibration.
7. Provide accommodation for installation of final connections by other trades and accessibility to components such as compressors, junction boxes, etc.…
8. Grind welds of stainless steel smooth and flush; polish to match adjacent surfaces.
9. Cut and drill components for service outlets and fixtures.
10. Provide access panels where required to access utilities.
11. Shop assemble work where possible.

B. Load Carrying Counter Surfaces: Reinforce frame support system and surfaces so that surfaces may safely support a load of 200 pounds concentrated on one square foot in any area or surface with no indentation showing on surface, and with permanent set not exceeding 0.005 inches.

2.6 FINISHES

A. Metal (Except Stainless Steel): Degrease and phosphate etch followed by primer

and minimum 2 coats factory baked epoxy enamel, color as selected by Architect from manufacturer's full range of standard and custom colors.

B. Plastic Laminate: Color as selected by Architect from manufacturer's full range of standard and custom colors.

C. Stainless Steel: Number 4 finish (unless indicated otherwise).

D. Bituminous Paint: Sound deaden internal surfaces of metal work and underside of metal counters and sinks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify all existing conditions and existing equipment requirements.

B. Verify ventilation outlets, service connections, and supports are correct and in required location.

C. Verify operational condition of existing equipment.

D. Report equipment discrepancies or non-operational equipment to the Architect.

3.2 INSTALLATION

A. Pre-installation site visits are required to obtain field measurements, verify finish dimensions, examine rough in progress and to coordinate with trades on site.

B. Use anchoring devices appropriate for equipment and expected usage.

C. Verify equipment is installed in accordance with the manufacturer's recommendations and requirement.

D. Insulate to prevent electrolysis between dissimilar metals. Provide sealant to achieve clean joint without crevices.

E. Weld and grind joints in stainless steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.

F. Sequence installation and erection to ensure mechanical, plumbing and electrical connections are achieved in an orderly and expeditious manner.

G. Cut, fit, and patch where necessary. Coordinate work with other trades.

H. Cut and drill tops, backs or other elements for service outlets, fixtures, and fittings.

I. Provide access panel or cutting and patching of items of this Section required for the installation or services of equipment.

J. Remove and reinstall existing equipment required under this Section. Foodservice Equipment contractor shall verify condition of existing equipment prior to removal, if being reinstalled by this contactor or reused by Owner.

K. Protect new and existing equipment during construction phase as required to prevent damage to equipment.

3.3 EXISTING EQUIPMENT

A. The Owner reserves the right to keep any existing equipment, coordinate with Owner on removal and transportation of equipment to a location of their choice. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain.
   1. Prior to removal from the kitchen any equipment that is labeled existing & relocate, Existing & remains or existing & reuse, the GC shall verify that the equipment is in working order and document via photos any damage and cleanliness Any damaged or not working equipment should be reported to GC/CM or Architect prior to moving.

B. It shall be the responsibility of this contractor to salvage equipment the Owner chooses not to retain. GC shall supply a list of salvage equipment (to include description, model, manufacture, and serial number) to CM/GC/Owner for sign off prior to removal. Provide document in FSE submittal process.

C. MEP disconnections by related trades, move, store and re-install equipment, ready for utility connection.

D. Coordinate scope of work and timeline with Owner and other trades prior to removal of existing equipment.

E. Clean and re-furbish existing equipment to be re-used to “like new” condition, as noted.
   1. Prior to removal from the kitchen any equipment that is labeled existing & relocate, Existing & remains or existing & reuse, the GC shall verify the cleanliness of existing equipment Any overly dirty/overly damaged equipment should be reported to the GC/CM or Architect prior to moving.

F. It is the responsibility of this contractor to provide storage as required until the piece of equipment is installed or re-installed.

G. It is the responsibility of this contractor to evacuate refrigerant, dismantle and remove all refrigeration equipment associated with existing walk-in cooler, freezer or equipment with remote refrigeration components (if applicable).

3.4 ADJUSTING

A. Upon completion of installation, adjust new and existing equipment and apparatus

to ensure proper working order and conditions.

B. If a new piece of equipment is not functioning properly and determined to be non-repairable in the field it shall be removed and replaced with a new piece of equipment.

C. Inspect all equipment and run each piece of equipment through a complete operating cycle to verify that equipment is fully operational.

3.5 CLEANING

A. Cleaning shall be conducted prior to the turnover of the kitchen to the owner

B. Remove masking or protective covering from stainless steel and other finished surfaces, including walk in panels, door handles and trim strips

C. Remove all packing materials and debris from jobsite.

D. Wash and clean new and existing equipment.

E. Polish glass, plastic, hardware and accessories, fixtures and fittings.

3.6 DEMONSTRATION AND TESTING

A. Demonstrations MUST I be conducted prior to the turnover of the kitchen to owner. GC shall provide sign in sheet from the demonstration showing attendance and what items were demonstrated. This document will be included with closeout documents.

B. All demonstrations must be coordinated by the GC and preformed prior to kitchen turn over. All demonstrations/training to be performed by a qualified manufactures representative. Demonstrations must include but not limited to operating procedures and maintenance.

C. Individuals performing demonstration shall be fully knowledgeable of all operating and service aspects of equipment.

D. Demonstrations on all new equipment shall NOT be performed by the FEC.

E. Test existing and new equipment to confirm equipment is operating as specified prior to demonstration. All testing of new equipment shall NOT be performed by the FEC.

F. Start-up, test, and adjust new equipment. Authorized factory technicians shall start-up equipment requiring testing and balancing, i.e. hoods, pulping systems, equipment with remote components, etc.

G. All equipment that qualifies for factory startups will be coordinated by GC and completed prior to equipment turn over to owner.

H. IT SHALL BE THE RESPONSIBILITY OF THE GC TO ENSURE THAT ALL START UPS ARE COMPLETED AND ANY RETURN TRIPS BY SERVICE AGENT TO FINISH DUE TO INCORRECT CONNECTIONS WILL BE PAID BY THIS CONTRACTOR.

PART 4 - LISTING OF FOODSERVICE EQUIPMENT

HOMER HIGH SCHOOL

4.1 Item 1 – Walk-In Freezer – One (1) Required

A. Custom Model BALLY Sectional Walk-in Cooler/ Freezer complete with doors shall be manufactured by Bally Refrigerated Boxes, Inc. drawing # 5703 Overall size of walk-in shall be approximately 10'-1 3/4"" long x 9-2 1/4" wide x 7'-6" high, size and configuration per Bally's current drawing# 5703 drawing (field verify Size).

1. Foam core panels shall be Underwriters Laboratories-listed as having flame spread of 25 or lower and smoke generation of 450 or lower when tested in accordance with ASTME-84-76. Panels shall be approved by Factory Mutual as a Class I building type. They shall be foamed using HCFC expanding agents and shall meet all current international standards.
2. All work and materials shall be in full accordance with local and/or state ordinances, and with other prevailing rules or regulations.
3. Panels shall consist of interior and exterior metals skins precisely foamed with steel and dies and roll-form equipment and thoroughly checked with gauges for accuracy. The metal skins shall be placed into heated molds and liquid urethane injected between them. Urethane shall be foamed-in place (poured, not frothed) and, when completely heat cured, shall bind tenaciously to the metal skins to form an insulated panel. Panels shall contain 100 percent urethane insulation and have no internal wood or structural members between the skins. To ensure tight joints, panel edges must have foamed-in-place tongues and grooves with a flexible vinyl gasket on the interior and exterior of all tongue edges. Gaskets shall be resistant to damage from oil, fats, water and detergents and must be NSF-approved. Panel thickness shall be 4" thick.
4. Exterior Finish:
   a. Walls, floor and ceiling shall be Stucco-embossed aluminum.
5. Interior Finish:
   a. Floor panels shall have ¾" Plywood foamed in panel and 1/8" aluminum Diamond Treadplate
   b. Walls and ceiling shall be Stucco-embossed aluminum
6. All panels except corner panels shall be made in 23" and 46" widths, fully interchangeable for fast, easy assembly. Panels 11-1/2", 17-1/4" or 34-1/2" wide are to be furnished only if required to fit the allocated space. To assure perfect alignment and maximum strength, corner panels shall employ a right-angle configuration with exterior horizontal dimensions of 12" on each side. Vertical panels (except corner panels) shall be supplied in a single length up to 28' high (16" high for installations with aluminum or stainless-steel finish). For outdoor

applications, single-height panels greater than 19” (16” for aluminum) or multi-tiered vertical panels must be secured to horizontal girts mounted between building columns. 8. Panels shall be equipped with Bally Speed-lok diaphragmatic joining devices. The distance between locks shall not exceed 46”. Each device shall consist of a cam action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the arm is rotated, the hook engages the rod and draws the panels tightly together with cam action. Arms and rods shall be housed in individual steel pockets. Pockets on one side of the panel shall be connected to pockets on the other side in width, by the use of 2” -wide metal straps set into and completely surrounded by the insulation. When panels are joined together, these straps shall form lock-to-lock connections for extra strength.

7. Supply one (1) Super Doors 36” wide x 78” height with 1/8” DT kick plate interior and exterior. Doors are in-fitting and flush mounted. Magnetic core, thermoplastic gaskets installed on the top edge and both sides of the door shall keep the door in a closed position, forming a tight seal; a flexible, dual blade wiper gasket shall be installed at the bottom of the door. NSF-approved gaskets shall be replaceable and resistant to damage from oil, fats, water and detergent. A heavy U-channel structural steel frame around the perimeter of the door opening shall prevent racking or twisting; steel frame is to be reinforced for hardware attachment. Anti-condensate heater wire shall be concealed behind the metal edge of the doorjambs. The door panel shall also include a vapor-proof interior lamp with LED light fixture; junction box for 120v., 60 cycle, 1 phase, a.c. service (15-amp maximum); 2”-dia. flush-face dial thermometer (field mounted on 60” wide doors).
8. Hardware
    a. Supply with each door: three spring-loaded, self-closing hinges and door closer. Provide satin aluminum finish.
9. Door Options
    a. Provide one Observation Window in each Entrance Door - (a 14” X 14”) heated observation window shall be provided in the entrance door. It consists of three panes of glass with sealed air spaces between them. The window shall be supplied with heated glass and frame and units shall be removable for replacement.)
    b. Provide one NSF-approved Strip Curtain for each door – clear-vinyl strip curtains shall permit easy passage while minimizing air infiltration.
    c. Bally’s standard door latch hardware.
    d. 1/8" D.T. Kickplate Int. & Ext.
    e. Interior stainless-steel ramp with treadplates.
10. Options:
    a. Provide Pressure Relief Port in freezer compartment.
    b. Alarm Systems -one door Provide one (1) 75LC Multi-Monitor w/ push button, one (1) MC1F Mag. Contacts, one (1) IP1 Panic Button, one motion detector
    c. Vinyl rub rail along entire exposed front and sides (verify color with Architect).
    d. One (1) LED Kason 1809 Lights LED 17” long, including bulbs.
    e. Provide trim strips alongside walls & closure panels along the top to finish

ceiling (same finish as wall panel).

11. Construction shall be of a design approved by the National Sanitation Foundation and shall carry the NSF Label of Approval mounted on each door section.
12. Warranties
    a. Bally shall warrant that any part of the structure it supplies (except the refrigeration system and its related accessories) is free from defects in materials or workmanship under normal use and service. The insulated panel portion of the structure is warranted free from defects under normal use and service for a period of 10 years from date of installation (but in no event shall the warranty be in force for more than 10 years and 6 months from the date the product was first shipped by Bally). Panel surface condition is warranted free from defects under normal use and service for one year from installation, provided the panel is stored and installed according to Bally's instructions. Mechanical (including hardware, gasketing, Speed-lok assemblies, aluminum weather roofs) and electrical components, except refrigeration systems (which are covered by a separate warranty) are warranted to be free from defects under normal use and service for one year from date of installation. (In no case shall this portion of the warranty be in force for more than one year and six months from the date the product was first shipped by Bally.) The warranty shall not include any labor charges for replacement or repair of defective parts or refrigeration. Full warranty information is to be provided with the walk-in.
13. CONTRACTOR'S RESPONSIBILITIES:
    a. It shall be the responsibility of this Contractor to Deliver, set-in-place and completely assemble the walk-in components and refrigeration systems. Install trim strips and closure panels (as specified - securely attached and sealed with silicone) between the box and all adjoining wall and ceiling areas. Material shall be of the same type and finish as the walk-in box surface. This contractor shall verify existing building conditions and field verify size and location of space where the walk-in is scheduled to be installed. Coordinate finished floor elevation with the Architect.
    b. Installation requirements of the walk-in box shall not be limited to but also include the following items:
        1) Verify that all panel to panel am locks are fully engaged and stainless cover caps are in place.
        2) Entrance door should close and seal on its own. Verify seal at gasket by checking for light from inside of door with interior light turned off. Adjust door hinges as required to obtain a tight seal.
        3) Remove all protective coating, shipping materials and packaging labels from panel surfaces, both inside and outside of the box
        4) Neatly seal all penetrations/gaps to prevent condensation or ice from occurring. Seal or verify seal at all electrical conduits both internally & externally at entrance point.
        5) Fasten door threshold plates to the floor panel using 12-24 x ½ self-tapping screws provided by Bally

6) Check door lock for proper operation, key should rotate freely for 90 degrees from the open to lock position. The key should sassily be removed from the cylinder in either the open or locked position.
7) Verify door frame heater operation. Heater strikes should feel warm to the touch.
8) Heat Trace required under freezer portion of walk in. GC to provide drawing of layout of heat trace in submittal process. Heat trace and installation of heat traces shall be supplied and installed by the electrical contractor. GC to coordinate.

c. Refrigerant used shall be of the latest type available and shall meet all codes and governmental requirements. All condensing units shall be factory assembled using UL listed or recognized components. Evaporators shall be forced air type, designed for ceiling installation. Freezer evaporators shall come with automatic electric defrost system with time clock, fan delay thermostat, heaters and heated drain pan. Evaporators shall be UL listed or recognized.
d. Verify location of condensing units with Architect.
e. It shall be the responsibility of this Contractor to completely install all refrigeration piping and controls (including interconnection of all electric) and pipe drain lines from coils in rigid copper to the floor drain, leaving the unit ready for final connections only by other trades. Drain line heater for freezer shall be supplied and installed by this Contractor. Electrical Contractor to interwire lights to switch.

4.2 Item 1A –Walk in Freezer Refrigeration System – One Lot (1 Lot) Required

A. Custom Model BALLY
1. Cooler: One (1) Scroll Condensing Unit – BEZA 025 L8 HT3D (208-230/3/60) 2.5 HP A/C Outdoor Scroll 10.7 Amps. With smart speed
2. One (1) Evaporator Coil SmartVapII – BLP 209 LE -S2D SV+ (120/1/60) SmartVap+ air defrost with EEV installed Evaporator coil.
3. 1 ea. Disconnect switch, fused 208-230
4. 1 Heated & insulated receiver
5. Five (5) year total refrigeration parts and compressor warranty(s).
6. Refrigeration piping and control wiring by Foodservice Contractor.
7. Installation requirements of the refrigeration system shall not be limited to but include the following:
a. Purge refrigerant lines with nitrogen while brazing to avoid carbon formation in the line sets. Installation of a field mounted liquid line filter drier is recommending just outside the evaporator cabinet to catch any contaminants that may have entered the system during installation
b. Perform leak check of all factory & field installed joints and mechanical connections. Double evacuate entire system to 250microns. Weigh in and document refrigerant type and total charge for cold weather operation.
c. Verify that site voltage is within specifications of equipment. Supply must be 5/+10% of name plate voltage. Verify that all mechanical and connections

are tight and sealed correctly

d. Evaporator drain lines must be properly trapped to avoid moisture and contaminates from being pulled back into the walk in. When sharing common drain line, make certain to install a trap between any freezer and cooler evaporator to avoid moisture from being drain back into the freezer compartment.
e. Freezer drain lines must be installed using copper pipe. Freezer drains must be heated and insulated to avoid freezing of pipe. Maintain adequate slope to allow for a fast removal of moisture from the line
f. Check and set pressure controls with refrigeration gauges. Make certain that differential settings allow the compressor to remain off line during any off-cycle periods
g. Check and adjust superheat at the evaporator coil. Coolers 8-12-degree F. Maintain a minimum of 20 degrees of super heat at the compressor to avoid liquid flood back
h. Suction lines must be insulated properly and neatly with no gaps through the entire length of the run. This insulation should be run through the insulated Bally panel and not just up to the penetration to avoid vapor leaks at the panel juncture.
i. Run systems through a complete operation cycle allowing them to pull down to set point temperature including a defrost cycle to verify all functions, setting and pressures are operation as specified.
j. On Smart Vap Controllers-(smart electric & air defrost systems) adjust the air sensor on the rear of the evaporator coil to a distance of 6” from the face of the coil surface
k. Smart Vap Electric defrost controller Should be set at a factory default for defrost is on a Demand basis. Adjustment under advance menu may be required

8. Roof curb will be furnished by this contractor and installed by others. Provide Roof Products, INC model# RPES-3 equipment support, 18 ga. galvanized steel construction; 2 X 4 pressure-treated wood nailers; vertical C-channel bulkheads; one-piece outer shell with welded corners; 18 ga. galvanized counterflashing. All welds micro-sealed and prime painted after fabrication. Provide two (2) supports per condensing unit: 48” - 42” long x 16” tall (size per manufacture recommendations).

4.3 Existing Equipment Removals:

A. It is the responsibility of this contractor to fully remove all existing foodservice equipment that will be replaced and dispose of (electric, plumbing & HVAC disconnections by related trades). Refer to 3.3 of this specification for existing equipment requirements.

A. Reused Existing Equipment:

B. THIS GENERAL CONTRACTOR (GC) SHALL BE RESPONSIBLE FOR IDENTIFYING, TAGGING AND/OR REMOVING ALL EXISTING EQUIPMENT, WHICH WILL BE REUSED. VERIFY AND COORDINATE SPECIFIC EQUIPMENT WITH THESE PLANS AND SPECIFICATIONS, AND THE OWNER. THIS SHALL INCLUDE ITEMS EXISTING, AND THE ASSOCIATED WORK NECESSARY, AT THE TIME OF THE SIGNING OF THE CONTRACT FOR THE FOODSERVICE EQUIPMENT SECTION; AND SHALL NOT INCLUDE ANY ITEM(S) ADDED, CHANGED, OR DAMAGED (BY OTHER THAN THE GENERAL CONTRACTOR (GC) AFTER THE SIGNING; EXCEPT TO THE EXTENT OF WORK WHICH WOULD HAVE BEEN INCLUDED WITH THE ORIGINAL EXISTING ITEM(S).

C. Remove from existing locations, clean and renovate as noted below, store and re-install existing equipment to be reused, in the new locations as shown on plans; ready for utility connections, as appropriate. Existing equipment to be reused, with utility connections, shall be removed after disconnection as noted in below paragraph.

D. Do work in cooperation with Owner, so that normal functioning of services is minimally interrupted. Coordinate all removal and replacement scheduling with the Construction Scheduling Manager (or similar responsible party), to ensure adequate time to complete the necessary work. If adequate time to properly relocate and reset the existing items and complete all cleaning and repair will not be available, due to continuing use of the existing item(s), or the allotted construction time; contact the Owner and obtain a written agreement as to what work is to be deleted or delayed; such as cleaning, repainting, or repairs.

E. All surface dirt, grease, oil, food residues, ingredients, extraneous matter, and other soiling materials shall be removed in order to obtain minimum acceptable sanitation and food service standards. Thorough final rinsing of all cleaning agents shall be at a minimum temperature of 180 degrees F where possible without damage to equipment or controls. Otherwise, use USDA approved cleaning agents and/or cleaning agents, which are acceptable for use with commercial food service equipment. This shall include all exterior surfaces of the existing equipment to be reused, and interior work surfaces such as inside oven compartments, fryer vats, ware washers, etc.

F. All painted items with major paint blemishes shall be sanded, primed, and repainted to match the original color and type paint. Primer and paint shall be of a type approved for use with commercial food service equipment. All controls, lights, view windows, non-painted parts, etc. shall be protected as recommended by the Manufacturer. Minor paint blemishes shall be touched-up in a professional manner. This work shall be included in the Bid Submittal, as a separate line cost, at the end of the Bid Submittal.

G. Replace or repair minor broken parts to produce a cleanable and functional item, where possible. Repairs and/or parts shall be for minor required items such as control knobs, handles, pilot lamps, belts, oil changes, minor adjustments, and recalibrations, etc. This shall not include addition or replacement of any wearing components such as cutters, blades, etc.; or any accessory components such as mixer beaters, hooks, whips, etc., except for presently existing accessory components which are broken and nonfunctional, or as noted in the itemized specifications.

4.4 Existing Conditions:

A. It is the responsibility of this contractor to fully review the existing conditions of the building and the new kitchen. This contractor shall be familiar with access to the kitchen location, including equipment access by elevators, stairwells, corridors, openings, including access around the exterior of the building for a crane or hoisting equipment (if required). It will be the responsibility of this contractor to coordinate equipment installation with the owner, CM, GC, etc.…

4.5 Plumbing of Equipment

A. The plumbing and General contractors are to comply with 1370-a and 1110, Subpart 67-4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York. All outlet fixtures used for drinking or cooking shall be tested by Owner prior to being put into service. All test results in exceedance of the action level shall require the fixture to be replaced until satisfactory test results are obtained at no additional cost to Owner."

PART 5 - DETAILS OF CONSTRUCTION

5.1 DETAIL DRAWINGS

A. The following details are a part of these specifications and shall be referred to for additional design requirements: None

END OF SECTION

SECTION 12 24 00
WINDOW SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Interior manual roller shades.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

B. Section 26 27 26 - Wiring Devices: Finish requirements for wall controls specified in this section.

1.3 REFERENCE STANDARDS

A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2019.

C. WCMA A100.1 - Safety of Window Covering Products; 2018.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.

B. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
   2. Do not install shades until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.

D. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.

E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.

F. Selection Samples: Include fabric samples in full range of available colors and patterns.

G. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

H. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

I. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.

J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

K. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this type with minimum five years of documented experience with shading systems of similar size and type.
   1. Manufacturer's authorized representative.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 MOCK-UP

A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams and batten pockets when applicable.
   1. Obtain Architect's approval of light and privacy characteristics of fabric prior to fabrication.
   2. Full-sized mock-up may become part of the final installation.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

B. Handle and store shades in accordance with manufacturer's recommendations.

1.9 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
   1. Shade Hardware: One year.
   2. Fabric: One year.
   3. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Interior Manually Operated Roller Shades:
1. Draper, Inc: www.draperinc.com/#sle.
2. MechoShade Systems LLC: www.mechoshade.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ROLLER SHADES

A. General:
1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
2. Provide shade system that operates smoothly when shades are raised or lowered.

B. Interior Roller Shades:
1. Basis of Design: Draper, Inc;; Clutch Operated FlexShade: www.draperinc.com/#sle.
a. Or Approved Equal.
2. Description: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and other components necessary for complete installation.
a. Drop Position: Regular roll.
b. Mounting: Wall mounted.
c. Size: As indicated on drawings.
d. Fabric: As indicated on drawings
3. Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
a. Hardware Type: Universal brackets.
b. Material Type: Plated stamped steel.
4. Roller Tubes: As required for type of shade operation; designed for removal without removing mounting hardware.
a. Material: Extruded aluminum or Steel, with wall thickness and material selected by manufacturer.
b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
c. Fabric Attachment: Utilize double-sided adhesive tape.
d. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.
5. Hembars: Designed to maintain bottom of shade straight and flat, selected from manufacturer's standard options.
a. Style: Closed pocket; aluminum elliptical slat inside pocket with heat-sealed ends.
6. Manual Operation:
a. Clutch Operator Location: Right side, unless noted otherwise.
b. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
c. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pounds minimum breaking strength. Provide upper and lower limit stops.
d. Shade Lift Assistance: Manufacturer's standard spring device contained in the idler end of roller tube to reduce force required to lift shades; as required based on shade weight.
e. Chain Retainer:
1) Chain tensioning device complying with WCMA A100.1.

2) Manufacturer's standard clip.

7. Accessories:
   a. Light Gap Reduction Channels: Provide extruded aluminum channels to reduce light leakage at sides of shades.
   b. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to mounting end caps, without exposed fasteners; clear anodized finish.
   c. End Cap Covers: Match fascia or headbox finish.
   d. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.3 SHADE FABRIC

A. Fabric for Light-Filtering Shades: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
   1. Manufacturers:
      a. Basis of Design: Draper Phifer Sheerweave PW4400 Series https://www.draperinc.com/.
      b. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Material: Vinyl coated polyester.
   3. Performance Requirements:
      a. Flammability: Pass NFPA 701 large and small tests.
      b. Fungal Resistance: No growth when tested according to ASTM G21.
   4. Openness Factor: 3%.
   5. Weight: 19.9 ounces per square yard.
   6. Roll Width: 84 inches.
   7. Color: As indicated on drawings.

B. Fabric for Room Darkening Shades: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
   1. Manufactuers:
      a. Basis of Design: Draper, SunBloc SB9000 Series https://www.draperinc.com/
      b. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Material: 25% fiberglass, 75% PVC coating
   3. Performance Requirements:
      a. Flammability: Pass NFPA 701 large and small tests.
      b. Fungal Resistance: No growth when tested according to ASTM G21.
   4. Openness Factor: [0%].
   5. Weight: 12 ounces per square yard.
   6. Roll Width: 72 inches.
   7. Color: As indicated on drawings.

2.4 ROLLER SHADE FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
   1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
   2. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed 3/4 inch total.

C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Start of installation shall be considered acceptance of substrates.

3.2 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking to support shades.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.

C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.4 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

C. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

3.5 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

3.6 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair, or replace damaged products before Substantial Completion.

3.7 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

END OF SECTION

SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Countertops for architectural cabinet work.

B. Wall-hung counters and vanity tops.

C. Solid surface window sills.

1.2 RELATED REQUIREMENTS

A. Section 06 41 00 - Architectural Wood Casework.

B. Section 09 30 00 - Tiling: Tile for countertops.

1.3 REFERENCE STANDARDS

A. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2018.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).

E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).

F. IAPMO Z124 - Plastic Plumbing Fixtures; 2017.

G. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

H. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.

I. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

J. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.

K. NSF 51 - Food Equipment Materials; 2017.

L. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

G. Installation Instructions: Manufacturer's installation instructions and recommendations.

H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

B. Quality Certification:
1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
2. Provide designated labels on shop drawings as required by certification program.
3. Provide designated labels on installed products as required by certification program.
4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
a. Manufacturers:
1) Formica Corporation: www.formica.com.
2) Panolam Industries International, Inc. Pionite: www.pionitelaminates.com.
3) Wilsonart: www.wilsonart.com.

4) Substitutions: See Section 01 60 00 - Product Requirements.
b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
c. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.
d. Finish: Matte or suede, gloss rating of 5 to 20.
e. Surface Color and Pattern: As indicated on drawings.
2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.
3. Exposed Edge Treatment: Molded rubber edge with T-spline, sized to completely cover edge of panel.
a. Color: As indicated on drawings.
4. Back and End Splashes: Same material, same construction.
5. Fabricate in accordance with manufacturer's standard requirements.

C. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
1. Manufacturers:
a. Durcon, Inc: www.durcon.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.
2. Flat Surface Thickness: 1 inch, nominal.
3. Chemical-Resistance: Provide products that resist the following chemicals with not more than Moderate Effect when tested in accordance with NEMA LD 3:
4. Flammability: Self-extinguishing, when tested in accordance with ASTM D635.
5. Surface Finish: Smooth, non-glare.
6. Color: As indicated on drawings.
7. Exposed Edge Shape: 3/16 inch radius corner.
8. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of all exposed edges.
9. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

D. Solid Surfacing Countertops and Sills: Solid surfacing sheet or plastic resin casting over continuous substrate.
1. Flat Sheet Thickness: 1/2 inch, minimum.
2. Solid Surfacing Sheet Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
3. Countertops shall be conventionally fabricated and self-edge banded with backsplash at cabinetry.
4. Sills shall be solid 1/2" solid surface material and fabricated as scheduled in drawings.
5. Manufacturers:
a. Dupont: www.corian.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.
c. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
d. Color and Pattern: As indicated on drawings.
6. Other Components Thickness: 1/2 inch, minimum.
7. Exposed Edge Treatment: Built up to minimum 1-1/2 inch thick; square edge; use marine edge at sinks.
8. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
9. Fabricate in accordance with manufacturer's standard requirements.

E. Natural Quartz Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
1. Flat Sheet Thickness: 3 cm, minimum.

2. Natural Quartz Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
   a. Manufacturers:
      1) [Basis of Design: Corian Quartz, https://www.corianquartz.com/].
      2) Dal-Tile Corporation: www.daltile.com/#sle.
      3) Wilsonart: www.wilsonart.com/#sle.
      4) Substitutions: See Section 01 60 00 - Product Requirements.
   b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
   c. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
   d. NSF approved for food contact.
   e. Sinks: Separate units for undercounter mounting; minimum 3/4 inch wall thickness; comply with IAPMO Z124.
   f. Finish on Exposed Surfaces: Polished.
   g. Color and Pattern: As indicated on drawings.
3. Other Components Thickness: 3/4 inch, minimum.
4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
5. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

2.2 MATERIALS

A. Extruded Aluminum: ASTM B211/B211M, 6463 alloy, T5 temper.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

C. Joint Sealant: Mildew-resistant silicone sealant, white.

D. Sealer: Stain and acid protection for natural stone counters.
   1. NSF approved for food contact per NSF 51.
   2. Products:
      a. STONETECH, a division of LATICRETE International, Inc: www.laticrete.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 ACCESSORIES

A. Fixed Top-Mounted Countertop Support Brackets:
   1. Material: Steel.
   2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
   3. Color: Black.
   4. Products:
      a. Centerline Brackets; Front Mounting Countertop Support: www.countertopbracket.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 ACCESSORIES

A. Countertop Supports (Up to 30" deep Countertops):
   1. Product: Rakks model #EH-1824.
   2. Components: 2" x 3" x 3/16" T; 6063-T6 extruded aluminum; TIG welded along both 45° mitered sides and across the back. All sharp edges ground and deburred.
   3. Capacity: 450 lbs per bracket.
   4. Finish: Mill aluminum.

5. Hardware: 5/16" holes accept 1/4" screws.
6. Provide flexible rubber U-channel at all brackets.
7. Provide solid wood blocking at all walls and countertops connected to brackets.

B. Countertop Supports (Up to 24" deep Countertops):
1. Product: Rakks model #EH-1818.
2. Components: 2" x 2" x 1/4" T; 6063-T6 extruded aluminum; TIG welded along both 45° mitered sides and across the back. All sharp edges ground and deburred.
3. Capacity: 450 lbs per bracket.
4. Finish: Mill aluminum.
5. Hardware: 5/16" holes accept 1/4" screws.
6. Provide flexible rubber U-channel at all brackets.
7. Provide solid wood blocking at all walls and countertops connected to brackets.

C. Countertop Supports (Up to 18" deep Countertops):
1. Product: Rakks model #EH-1212.
2. Components: 2" x 2" x 1/4" T; 6063-T6 extruded aluminum; TIG welded along both 45° mitered sides and across the back. All sharp edges ground and deburred.
3. Capacity: 450 lbs per bracket.
4. Finish: Mill aluminum.
5. Hardware: 5/16" holes accept 1/4" screws.
6. Provide flexible rubber U-channel at all brackets.
7. Provide solid wood blocking at all walls and countertops connected to brackets.

2.5 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
1. Join lengths of tops using best method recommended by manufacturer.
2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
a. Rout a 1/8 inch drip groove at underside of exposed overlapping edges, set back 1/2 inch from face of edge.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches, unless otherwise indicated.

C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
1. Integral sinks: Shop-mount securely to countertop with adhesives, using flush configuration, as per manufacturer's instructions, and as detailed on drawings.

D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install vanities in accordance with manufacturer92s instructions and approved shop drawings

B. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

C. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.

D. Attach epoxy resin countertops using compatible adhesive.

E. Apply sealer products in accordance with manufacturer's written instructions.

F. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

A. Clean countertops surfaces thoroughly.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

SCHEDULES

4.1 REFER TO FINISH KEY AND SCHEDULES.

END OF SECTION

SECTION 12 66 13
TELESCOPING BLEACHERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Telescoping bleachers.

B. Electric motor operators, controls, and internal wiring.

1.2 RELATED REQUIREMENTS

A. Section 26 05 83 - Wiring Connections: Connection of electric motors and controls.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ICC 300 - 2012 - Standard for Bleachers, Folding and Telescopic Seating, and Grandstands.

C. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

D. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

E. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2016.

F. PS 1 - Structural Plywood; 2009.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage handling and requirements.
   3. Installation methods.

C. Shop Drawings: Complete layout with dimensions, seat heights, row spacing and rise, aisle widths and locations, points of connection to substrate, assembly dimensions, and material types and finishes.
   1. Provide drawings customized to this project.
   2. Include Professional Engineer certification.
   3. Wiring Diagrams: Show locations of motors, electrical wiring, and rough-in connections.

D. Selection Samples: For each material for which color selection is required, submit samples, 2 by 2 inches in size, illustrating colors and finishes available.

E. Operation and Maintenance Data: Manufacturer's operation and maintenance instructions, including annual inspection and maintenance and bi-annual inspection by a Professional Engineer or manufacturer factory service personnel.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Manufacturer's installation crew.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion. Replace parts that fail under normal use at no extra charge to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Telescoping Bleachers:
1. Interkal LLC: www.interkal.com/#sle.
2. Irwin Telescopic Seating Company: www.irwintelescopicseating.com/#sle.
3. Hussey Seating Company: www.husseyseating.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TELESCOPING BLEACHERS

A. Telescoping Bleachers: Factory assembled tiered benches that retract horizontally into depth approximately the same as a single row depth, with fixed seats mounted on leading edge of platforms.
1. Design to comply with applicable requirements of NFPA 102 and requirements of code authorities having jurisdiction; where conflicts between requirements occur, comply with whichever is more stringent.
2. Design with solid fascia (riser) or seat fronts that conceal interior mechanisms when fully retracted, fitting tightly enough to prevent climbing up face; at front row provide key locked, hinged fascia (skirt) to cover gap between seat riser/fascia and floor.
3. Standard Extension: Top row fixed to floor, adjacent to wall, forward extension (away from wall); attachment to wall acceptable.
4. Wheelchair Spaces: Allow portions of first row, as indicated, to be manually retracted without affecting other rows; provide removable railings at row two behind wheelchair spaces in compliance with ADA Standards.
5. Operation: Motor operated.

B. Design Loads: Design to withstand the following loading conditions:
1. Live Load on Structural Supports: 100 psf, minimum, of gross horizontal projection.
2. Live Load on Seats and Walking Surfaces: 120 pounds per linear foot.
3. Lateral Sway Stress on Structural Supports: 24 pounds per linear foot of seat plank.
4. Perpendicular Sway Stress on Structural Supports: 10 pounds per linear foot of seat plank.

C. Dimensions:
1. Rows: 6.
2. Rise Per Row: 10 inches.
3. Row Depth: 22 inches.
4. Seat Height Above Tread: 6 inches.

D. Structural Supports: Steel or aluminum; manufacturer's standard wheeled carriages supporting each tier separately, with moving parts permanently lubricated and metal parts cushioned to prevent metal-to-metal contact during operation.
   1. Design so that each row carriage so that it will individually support the design loads and is self supporting when fully assembled without dependence on platform panels or boards, seats, or fascia.
   2. Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
   3. Bolting: Use lock-washers or locknuts.
   4. Wheels: Minimum 5 inch diameter by 1-1/8 inch wide, with non-marring rubber tires; ball, roller, or oil-impregnated metal bearings; minimum of 2 wheels at each floor support.
   5. Finish: Manufacturer's standard enamel or powder coating.
   6. Row Locking: Automatically mechanically lock each carriage to adjacent carriages when fully extended.
   7. Unlocking: Automatically unlock all rows before engaging retraction mechanism.

E. Motor Operation: Manufacturer's standard drive mechanism, using motor adequately sized for the purpose.
   1. Provide UL listed electrical components and wiring.
   2. Controls: Start, Stop, Forward, and Reverse in a single control unit.
   3. Control Station: Removable plug-in low-voltage pendant station, with first-row plug-in location for each motor.
   4. Limit Switches: Automatically stop operation when unit has reached fully open or fully closed position.
   5. Provide all wiring internal to bleacher units, to junction box located where indicated; ensure that wiring is not energized except during operation.
   6. Electrical Characteristics: 120V, single phase, 60 Hz.
   7. Provide access to motor from front side of bleachers; a hinged front skirt or hinged section at least 30 inches wide is acceptable.

2.3 SEAT AND PLATFORM COMPONENTS

A. Seat/Fascia Assembly: Continuous, molded UV-stabilized high-density polyethylene plastic, seat minimum 1 inch thick, textured finish, homogeneous color throughout, color as selected from manufacturer's standard selection; approximately 18 inch long sections independently removable with tongue-and-groove or rabbeted interlock at end joints.
   1. Shape: Ergonomically contoured, with internal ribs spaced for natural flexibility; rear edge cantilevered to provide toe room of not less than 3 inches; no openings to trap debris.
   2. Provide end caps of same material and finish on each exposed end.
   3. Supports: Internal steel reinforcement of each seat segment bolted to platform nose member; minimum two bolts per segment.

B. Platform, Tread, and Step Structure: Plywood continuously supported on front and rear with side joints tongue-and-grooved.
   1. Plywood: PS 1, 5-ply southern pine or polyethylene-overlaid douglas fir or southern pine, Grade A-C.
   2. Plywood Thickness: 5/8 inch, minimum.
   3. Front (Nose), Rear, and Intermediate Supports: Steel channel or tube, hot-dipped galvanized.
   4. Provide end caps of same material and finish on each exposed end.
   5. Finish: High gloss clear urethane, both sides, unless polyethylene finished.
   6. Nosings: Formed steel, minimum, G60/Z275 hot-dipped galvanized.
   7. At aisles provide permanently attached intermediate steps of same construction and finish.
   8. At bottom of aisles provide step in front of first riser, hinged to first platform to fold for storage.

2.4 HANDRAILS AND RAILINGS

A. Provide the following railings:
   1. Aisle Handrails: Single post folding railing segment mounted in center of aisle at every other row beginning at row 2.
   2. End of Row Guardrails: Self-storing, at open ends of sections beginning at row 2.
   3. Height: 42 inches above adjacent platform or tread.

B. Design handrails and railings to withstand the following loads:
   1. Concentrated Load on Handrails: 200 pounds in any direction.
   2. Concentrated Load on Guardrails: 200 pounds in any direction along top rail.
   3. Live Load on Handrails: 50 pounds per linear foot, applied in any direction.
   4. Live Load on Guardrails:
      a. Horizontal: 50 pounds per linear foot, applied at the guardrail height.
      b. Vertical: 100 pounds per linear foot, applied vertically to top of guardrail.

C. Railing Construction: Round steel or aluminum pipe or tube, with formed elbows at corners and caps at ends of straight runs.
   1. Aluminum: 1.66 inches minimum outside diameter; natural anodized finish.
   2. Steel: 1-1/2 inch minimum outside diameter, with 11 gauge, 0.12 inch minimum wall thickness; textured powder coat epoxy finish.

2.5 ACCESSORIES

A. Fillers and Closures:
   1. Top Row: Provide seat level rear filler panels to close openings between top row seat and wall; finish to match platforms.
   2. Sides of Extended Units: Vinyl curtains.
   3. Vinyl Curtains: 18 ounce vinyl with grommets; color as selected from manufacturer's standard palette.

B. Motion Monitor: Strobe light and warning horn rated at 150 dB, both of which operate continuously during movement of any section of bleachers; mount strobe light where it is clearly visible to entire bleacher installation.

C. Fasteners: Provide hardware and fasteners in accordance with manufacturer's recommendations.

D. Anchorage: As indicated on drawings; provide hardware in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are consistent with those on the shop drawings.

B. Verify that electrical rough-ins have been installed and are accessible.

C. Do not begin installation until substrates have been properly prepared and area has been cleared of obstructions.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Do not field cut or alter seats, fascia, or structural members without approval.

C. Provide manufacturer's field representative to inspect completed installation.

3.4 ADJUSTING

A. Lubricate, test, and adjust each moving assembly to ensure proper operation in compliance with manufacturer's recommendations.

3.5 CLEANING

A. Clean exposed and semi-exposed assembly surfaces.

B. Touch up finishes on damaged or soiled areas.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 13 34 23
FABRICATED PRESS BOX

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Modular press box; adjacent to existing bleachers.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 08 71 00 - Door Hardware.

C. Division 26 - Electrical: Electrical requirements.

D. Division 27 - Communications: Technology requirements.

1.3 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.

B. ACI 318 - Building Code Requirements for Structural Concrete; 2019, with Errata (2021).

C. AISC (MAN) - Steel Construction Manual; 2017.

D. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2018.

E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.

G. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

I. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

J. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

K. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).

L. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.

M. ICC 300 - Standard on Bleachers, Folding and Telescopic Seating, and Grandstands; 2017.

N. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2016.

O. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 APPROVALS

A. Any deviation from any item in overall specification shall be submitted to Architect a minimum of fifteen days prior to bid for review.

B. This submittal shall include calculations by a registered engineer showing the deviations meet or exceed the specified item they are intending to replace.
   1. Failure of Bidder to comply with this requirement is cause for rejection.

1.5 DESIGN CRITERIA

A. Press box shall be designed in accordance with the codes, rules and regulations of the State of New York. Modifications required by these codes shall be incorporated into the design prior to bid and will not constitute a change in the price after contract award.

B. All material and workmanship shall be in accordance with the applicable State Building Code, current edition, see Section 01 41 13 - Codes, as well as the following:
   1. AISC (MAN) - AISC Manual, Current Edition.
   2. ACI 318 Building Code for Reinforced Concrete.
   3. ICC 300 - Current Edition.
   4. NFPA 102 - Current Edition.

C. Code Compliance: Submittals shall be based upon specifications and drawings contained in the bid documents.
   1. The Contractor shall be responsible to meet the code interpretation provided in the bid documents and modify as required by state or local governmental review boards.
   2. Signed and sealed structural calculations shall be required with submittal drawings.
   3. Delegated designer must be licensed in NYS.

D. Design Loads:
   1. As indicated on the drawings, but not less than the following:
      a. Minimum Live Load:
         1) Floor: 100 psf.
         2) Roof: 100 psf with viewing platform.
         3) Wind on vertical surfaces: per applicable Building Code and ASCE 7; Risk Category II, Exposure C.
   2. The Press box, stair landing, guard railings, handrails, stairs, and concrete foundation shall be designed to support all engineered required loads per applicable Building code and ASCE 7.
   3. The Press box shall be properly braced for wind and construction loads. Lateral and longitudinal bays shall be cross-braced as required.

E. Foundation, reinforcing, and steel support structure shall comply with the following:
   1. Concrete mix design: 3000 psi minimum: See Section 03 30 00 Cast-in-Place Concrete.
   2. Reinforcement bars, Ties and Stirrups: Grade 60, ASTM A615/A615M.
   3. Headed Anchor Rods, Lock Nuts and Washers: Hot-dipped Galvanized steel, ASTM F1554, Grade 36.
   4. Columns: Rolled shapes, ASTM A992/A992M, Fy=50 ksi, or Cold-formed Steel tubing, ASTM A500/A500M.
   5. Base Plates: Cold-rolled plate, ASTM A36/A36M, welded to columns and fastened to foundation with headed anchor rods.

F. Dimensional Lumber: Nominal sizes as engineered, S4S, Kiln-dry or MC-15, #2 SPF or better, floor and roof joists #2 SYP or better, no greater than 16 inches on center framing.
   1. At manufacturer's option, CFMF may be incorporated in lieu of dimensional lumber with approved engineering and calculations.

G. Design Classification

1. Use Group: U, Construction Type: V-B.

1.6 SUBMITTALS

A. Product Data: Provide product cut sheets for items being incorporated into the work of this section.

B. Shop Drawings and Calculations: Provide complete set including plan views with framing plans at every level, foundation plan and wall sections showing complete detail of layout, connection and trim details.
   1. Shop drawings and calculations stamped and signed by a Professional Engineer licensed in the State of New York.
   2. Calculations shall take into account all vertical and lateral loads required by Applicable Code.

C. Reinforcement Placement Drawings:
   1. Indicate foundation size, depth, reinforcement and embedded items.

D. Provide color sample selection cards for items requiring selection and approval.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

1.7 QUALITY ASSURANCE

A. Design structural components, develop shop drawings, and calculations under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of New York.

B. Manufacturer Qualifications: Company specializing in modular building construction with experience in manufacturing press boxes, with a minimum of five years experience.

C. Installer Qualifications: Company specializing in the erection of structural support and setting, installation and set up of prefabricated modular buildings, and approved by press box manufacturer.

1.8 WARRANTY

A. Provide manufacturer's one year warranty covering all components of the prefabricated building, support structure and foundations against defective material or workmanship. Damage resulting from abnormal use or vandalism is not applicable.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Dant Clayton Corporation; www.stadiumbleachers.com

B. E&D Specialty Stands, Inc.; www.edstands.com

C. GT Grandstands; www.gtgrandstands.com

2.2 BASIS OF DESIGN

A. The basis of design manufacturer for the prefabricated, modular press box shall be equal to that provided by Dant Clayton Corporation: www.stadiumbleachers.com.

B. Or Approved Equal.

C. Substitutions: See Section 01 60 00 - Product Requirements

2.3 FLOOR CONSTRUCTION

A. Closure Pan: 29 gauge; 0.0135 inch one-piece galvanized steel pan.

B. Bottom Board: Glass mat faced gypsum sheathing panels, ASTM C1177/C1177M, 5/8 inch Type-X fire-resistant; UL fastening, Class A F.S.R.

C. Insulation: R-21 fiberglass batts, with vapor barrier.

D. Floor Joists: Per engineered design to meet design loading criteria and spans, 16 inches on center, maximum, longitudinal framing.
   1. Joists material may include dimensional lumber, structural composite lumber, or cold formed metal framing.

E. Sub Floor: 1/2 inch CDX plywood, APA rated 32/16, minimum.

F. Underlayment: APA underlayment; fir plywood, tongue and groove edges: 5/8 inch Sturd-I-Floor, or better.

G. Flooring: Vinyl composition tile complying with ASTM F1066, Class 1, 0.125 inch thick: Armstrong Excelon, or equal.

H. Resilient Base Molding: Type TP, rubber, thermoplastic; height 4 inch: Roppe or equal.

2.4 WALL CONSTRUCTION

A. Wall Covering: Vinyl faced 5/8 inch Type X fire-rated gypsum, UL fastening, Class A F.S.R. with associated trims and finish materials.

B. Interior Sheathing: 4-mil polyethylene vapor barrier and 5/8 inch Type X fire-rated gypsum, UL fastening, Class A F.S.R.

C. Dimensional Lumber: Nominal sizes as engineered, S4S, Kiln-dry or MC-15, #2 SPF or better, no greater than 16 inches on center framing.
   1. At manufacturer's option, CFMF may be incorporated in lieu of dimensional lumber with approved engineering and calculations.

D. Headers: As span and design load requires.

E. Insulation: R-13 fiberglass batts with vapor barrier.

F. Steel Siding:
   1. 19/32 inch CDX plywood.
   2. Building wrap weather barrier.
   3. Siding: Factory finished 26 gauge, 0.0179 inch ribbed steel panels with associated trims and closure pieces with Kynar 500 finish: Metal Sales "U-Panel", or equal.
      a. Color: As selected by Architect from manufacturer's full range.

2.5 ROOF CONSTRUCTION

A. Ceiling: 5/8 inch Type-X fire-rated gypsum board, UL fastening, taped and bedded with spray textured finish, Class A F.S.R.

B. Sub Ceiling: 5/8 inch Type X fire-rated gypsum board, UL fastening, Class A F.S.R.

C. Roof Joists: Per engineered design to meet design loading criteria and spans, 16 inches on center, maximum, transverse framing.

1. Joists material may include dimensional lumber, structural composite lumber, or cold formed metal framing.
2. Overhang: Front wall: 15-1/2 inches; Rear wall 6 inches.

D. Insulation: R-36.2 2 inch ISOBOARD foam insulation with vapor barrier triple layered to achieve R-value.

E. Roof Sheathing: 1/2 inch CDX plywood, APA rated 32/16, minimum.

F. Decking: APA underlayment grade, fir plywood, tongue and groove edges: 5/8 inch Sturd-I-Floor, or better. APA rated 20 inches O.C.

G. Covering: Single-ply membrane, 0.060 PVC, fully adhered; skid and spike resistant.

H. Trim and Closures: Provide aluminum fascia and vented soffit around entire perimeter of roof.

2.6 ROOF HATCH

A. Pressbox manufacturer to provide interior aluminum ships ladder 60 degrees, with integral handrails with BILCO roof hatch model "BIL-GUARD NB" or approved equal.

2.7 EMERGENCY EGRESS LADDER

A. Prefabricated Folding Deployable Ladder: Bolted metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.

B. Ladder shall be self storing in nominal 3x3 inch area when stored. Ladder shall be manually deployed by means of quarter turn lever located at each point of egress.
1. No deployment lever shall be located closer than eight feet from ladder base to prevent unauthorized access from lowest level.
2. Components: Manufacturer's standard rails, non-slip rungs, handrails, returns, building overshoots, mounting brackets, and safety devices complying with the requirements of the MATERIALS article of this section.
3. Materials: All components shall be of corrosion resistant material.
   a. Uprights, Rungs and U-channel reinforcement: Aluminum.
   b. Hardware: Stainless Steel.
   c. Joint Washers and Bushings: Polyamide.
4. Finish: Powder Coated: Color as selected by Architect from manufacturer's full range.
5. Mounting: Ladder shall be perpendicular to mounting wall in deployed position.
6. Products:
   a. Jomy, Inc; Mini Jomy Retractable Ladder: www.jomy.com/en-us.
   b. Or Approved Equal.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

2.8 STAIRS, HANDRAILS AND GUARDRAILS

A. Stairs
1. Maximum rise: Seven inches per Building Code with aluminum closure.
2. Minimum tread depth: Eleven inches per Building Code.
3. Stairs to have handrail extension.

B. Handrails
1. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corner. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the nosing of treads and landings. Handrails shall be continuous the full length of the stairs and shall extend in the direction of the stair run

not less than 12 inches beyond the bottom riser. Ends shall be returned or shall terminate in newel posts or safety terminals.

C. Guardrails
1. Guard railing to be located around landing, on both sides of stairs, and at areas indicated on pressbox roof.
a. Provide self closing gate at access point of emergency egress ladder.
2. Guardrails on Stair to be (42) inches above leading edge of step with intermediate rails
3. Rail support riser to be galvanized steel angle 3 x 3 x 1/4 inch (minimum).
4. Top and bottom rails to be clear anodized aluminum pipe; 1 5/8 inch dia. (minimum).
a. Secure rail to rail support per the Pressbox manufacturer.
5. Fabric to be 9 gauge galvanized fence, minimum. (2” mesh).
6. Secure fence fabric to rail and galvanized tension bars with aluminum wire ties no greater than 18 inches on center.

2.9 WINDOWS

A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
1. Configuration: As indicated on drawings.
a. Product Type: FW - Fixed window and HS - Horizontal sliding window in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
b. Operable units: Provide removable insect screen.

B. Design Pressure: In accordance with applicable codes.

C. Glazing: Insulated double pane, tempered glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions.

D. Overall Thermal Transmittance (U-Value): 0.36, maximum, including glazing, measured on window sizes required for this project.

E. Product:
1. Soft-Lite; Barrington.
2. Or Approved Equal.

2.10 DOORS

A. Exterior Doors - Thermally Insulated.
1. Insulated vinyl-faced steel clad. Size: As indicated on Drawings.
2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Thermal Resistance: R-Value of 11.9, minimum, when tested in accordance to ASTM C1363.
4. Glazing: 16 inch Insulated double pane, tempered glass, clear, uncoated, manufacturer's standard fill, with glass thicknesses as recommended by manufacturer for specified conditions, factory installed.
5. Frame: Steel with aluminum threshold, stainless steel hinges, and vinyl weatherstripping.
a. Provide heavy-duty retention chains.
6. Door Hardware: See Section 08 71 00 - Door Hardware.

2.11 SCORERS' COUNTER

A. 18 inch deep x 1-1/2 inch thick aluminum counter.

B. Counter shall be fully supported by steel support brackets, at no greater than 32 inch spacing.

C. Provide plastic grommets in pre-drilled holes.

2.12 ELECTRICAL

A. All electric work shall comply with NFPA 70, and components shall be UL listed.

B. Service Entrance Panel: Square D Q0124M200 with Main Disconnect; rated at 120/208v, three phase, 200 amp capacity.

C. Receptacles: Pass & Seymour 125 volt/20 amp duplex, spec-grade, along the rear wall. Wiremold 5400 Series two-piece multi-channel, dual voltage, non-metallic surface raceway along front wall below scorer's counter, outlets on 48 inch centers.

D. Lighting: Lithonia flat panel LED with selectable lumens and diffused lens

E. Circuits: All branch circuit wiring is minimum #12 THHN encased in EMT thin wall conduit or MC Cable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation: Shall be handled directly by the manufacturer or by a factory certified installation subcontractor.

B. Erect per plans, shop drawings, and specifications.

3.2 CLEANING

A. Clean all surfaces according to manufacturer's recommendations.

B. Remove all packaging and construction debris.

END OF SECTION

SECTION 19 1000
PERFORMANCE SOUND SYSTEMS

PART 1 - GENERAL

1.1 PROJECT INFORMATION:

A. Owner: Homer Central School District

2021 Homer Capital Improvements Project
Intermediate/Junior High School
58 Clinton Street
Homer, NY 13077

B. Architect: Hunt Engineers, Architects & Land Surveyors P.C.

Airport Corporate Park
100 Hunt Center
Horseheads, New York 14845

C. Consultant: AVL Designs, Incorporated

1788 Penfield Rd, Suite 1
Penfield, New York 14526
Phone (585) 586-1100

D. Contractor: The successful bidder for the work described herein. Also referred to as the Theatrical Contractor (TC), the sound contractor, or the bidder.

1.2 PROFESSIONAL STANDARDS

A. The contractor is expected to install all work to the appropriate industry professional standards, manufacturer recommendations, and current applicable codes. If any work required exceeds the skills of the contractor they will employ appropriate subcontractors for the scope required.

B. The acceptability of materials and workmanship will be determined by the Architect, Consultant, and CM.

C. Any work that might be damaged, be inadvertently painted, or become dirty during construction will be protected by the contractor. All responsibility for protection shall be by the contractor. The contractor will provide final cleaning and or repair of all equipment in their scope to like new condition.

D. The contractor will attend and/or arrange meetings as required to make sure their scope is coordinated with all other trades. The contractor is responsible to make known to all other trades critically dimensioned items and locations to avoid conflicts. Where conflicts occur follow required procedures in the project manual to seek resolution.

E. Where any substandard work is provided by related trades that impedes the work of the contractor they will notify the CM, Consultant, Architect, or Engineer in writing as called for one the project manila to rectify the issue.

F. Where work is provided by others the contractor is responsible to verify installation conditions that relate to their work. If installation of related work is substandard the contractor shall generate a written RFI through proper channels based upon the project manual. The contractor shall not install their work to any substandard devices, etc. provided by others until such work has been resolved or until the contractor has received written authorization from the construction manager to proceed. If the contractor ignores substandard installation work by others and proceeds to install his devices to these items, then they accepts and bears sole responsibility to repair, reinstall and correct any found deficiencies to the satisfaction of the owner upon final inspections.

G. The contractor will comply with the AHJ (Authority having jurisdiction) as it relates to programming any and all emergency interfaces.

H. The contractor is expected to possess knowledge of the equipment of their industry and provide all required small items required install specified equipment. Provide small Items such as rack rails, din rails, power cords, connectors, wall wart power supplies, crimps, nicopress, and other items that may not be called out on drawings or in specs as required to support primary equipment.

I. When in doubt about any aspect of the work the contractor should not proceed until they obtain clarification from the appropriate entity following procedures detailed in the project manual.

1.3 DEFINITIONS

Code Requirements	Minimum requirements as specified by all applicable and published codes.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Devices	Any piece of gear, equipment, indicated component and any misc. related items required to implement and install a fully functioning system.
Equal or Equivalent	Equally acceptable as determined by Owner’s Representative.
Extend	To increase the length(s) of any indicated conduit/wiring, etc. so as to reach a particular specified or implied point – including the provision of any misc. additional equipment as required for proper extension and to maintain full system functionality.
Final Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnish	Supply and deliver to installation location to the appropriate trade responsible for installation.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative
Install	Mount and connect equipment and associated items and make ready for use.
Labeled	Refers to classification by a standards agency.

Or Approved Equal	Approved equal or equivalent as determined by Owner's Representative.
Owner's Representative	The Prime Professional, Construction Management or Clerk of the Works.
Patching	Repair of holes, marks, and damage left from removals. Consult project manual for requirements.
Provide	Furnish, install and connect ready for use.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Remove	Safely Disconnect including any and all wiring, hardware, conduit (except concealed), anchors, suspension hardware etc. Legally dispose of items not called out to be offered to or returned to owner.
Review	A general contractual conformance check of specified products.
Satisfactory	As specified in contract documents.
Shall	Indicates that the contractor must perform work and provide devices as indicated. This is a mandatory, obligatory, contractual requirement and is not optional in any way.

1.4 INTENT OF DRAWINGS:

A. Throughout the contract documents there are various manufacturers and products referenced. It is understood that these products establish a basis of design that all other "or equal" Equivalents must meet or exceed. All submitted devices must be the referenced product or approved equal.

B. The drawings in this package are diagrammatic in nature, unless detailed dimensioned drawings are included. The drawings show the approximate locations of equipment and devices. The final and exact locations of all non-dimensioned devices are subject to the approval of the Owner or the Owner's Representative. Devices with detailed installation dimensions; however, are critically located and must be installed to those indicated dimensions unless alternate instructions have been given to the contractor in writing by the consultant.

C. The contractor(s) shall inspect the entire building(s) with the Owner's representative prior to beginning any work and shall identify the exact locations and installation methods for all devices, conduit and wiring prior to beginning work.

D. Typical details are shown for the installation of various devices. The details do not apply to all situations. Installation methods for all work shall be subject to the Owners and construction manager's approval. Provide all work and equipment required for a professional, workmanlike installation.

1.5 SECTION INCLUDES BUT IS NOT LIMITED TO:

A. Removals – May include storage and reinstallation of some items

B. Provision of audio and AV system and related work scope as indicated on drawings..

C. Furnishing some equipment for install by others

D. Wiring, Set up, and commissioning

E. Training and closeout documents

1.6 RELATED SECTIONS & DOCUMENTS:

A. The contractor's shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification. The contractor will be responsible for cooperation with and adherence to the overall scope and intent of the project relative to the work being done by the contractor.

B. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 0, 1, and 16 specification sections apply to work of this section (related specification sections may vary depending upon the particular CSI format being adhered to). All related drawings, contract conditions and general requirements found in the project manual that apply to the general contract will apply to the work described in this specification. Examine all referenced documents for general project requirements relating to the work in this specification. Contact the architects, engineers and/or construction manager for any clarification required to properly bid this project. It is the contractor's responsibility to obtain necessary clarification before bidding. No change orders will be allowed for existing project conditions and contractor requirements not properly investigated by the contractor.

1.7 GENERAL REQUIREMENTS

A. Removals - Offer all existing portable and removed equipment to the owner prior to legally disposing of these items. Obtain written permission from the owner for all existing removed items that they do not desire to retain prior to disposal.

B. Provide all equipment outlined and described within this specification and assemble it into a complete, properly functioning system for use by the owner as described within this specification.

C. It is the contractor's responsibility to clarify any misunderstandings or drawing-drawing/drawing-spec discrepancies prior to bid. In cases of a difference between stated quantities in drawings, specs or electrical drawings, the higher quantity will prevail.

D. Check each component before installation as well as each portion of the project during installation to ensure that the intent of this specification is achieved.

E. Painting: The speakers are to be painted to match the ceiling. The contractor will be responsible for obtaining paint from the painting contractor to match the color after the room has been finished. The contractor shall be responsible for all prep work required for painting of the enclosures. The contractor shall warranty the painting of the speakers for 5 years. All mounting hardware shall be painted to match.

1.8 BIDDER QUALIFICATIONS – SUBMITTALS:

A. The bidder shall provide references of at least three (3) installations of comparable scope performed by the bidder, including location, system description, and name, address, and

telephone number of the architects, consultants, and owners and the names of contract persons for each.

B. The bidder must maintain service facilities and have service available on site within 24 hours. The bidder must be a factory authorized dealer for all products submitted and may be required to submit such proof of factory authorization in writing, or in the form of copies of authorized agreements with the various vendors.

1.9 INQUIRIES AND COMMUNICATIONS:

A. All questions shall be generated as called for in the project manual.

B. Direct communications to the consultant via phone are recommended for initial discussion about intent or site issues. (unless prohibited in the project manual). No action may be taken based on verbal communications, they must be followed up in writing as called for in the project manual.

C. Where discrepancies occur and pre bid instructions have not been obtained by written request, the contractor will abide by the owners decision at no additional cost to the owner.

1.10 COORDINATION:

A. Cooperate with other trades to achieve well-coordinated progress at all times. Notify the owner and consultant as often as necessary with regards to job progress or changes in the installation schedule. All conflicts will be reported to the architect, construction manager, owner, and consultant in writing. All reasonable attempts will be made to correct any difficulties.

B. Staff the job site adequately at all times to maintain a progress in keeping with the total project progress.

C. Provide all materials to be installed by others in a timely fashion based upon the related trades' schedules.

D. The job site will be left in a clean safe condition at the end of any workday. All cleanup and debris removal to a site designated by the owner will be the responsibility of the bidder on a daily basis.

E. All storage of tools and materials will be done by the contractor. No on site storage security will be provided by the owner.

F. The contractor will attend regular meetings with the architect, owner, general contractor, and the consultant when requested by any of the above, in order to achieve project coordination and progress.

1.11 DELIVERIES

A. It is each contractor's responsibility to receive all device shipments, equipment, deliveries, etc. for their own equipment on/at the job site personally. Each contractor shall be responsible to arrange for storage of all received materials on site until the appropriate time when they shall either turn them over to installing contractor or install them.

B. If the contractor chooses to allow a third party to receive shipments on his behalf the contractor bears sole responsibility for any missing and/or damaged parts.

C. Any equipment that is furnished by the contractor for installation by others shall be turned over to the installing contractor at a time that fits into their production schedule and the project's overall construction schedule.

1.12 STANDARDS REFERENCES:

A. The contractor is responsible for the provision of material and methods for installation of equipment conforming to the currently applicable standards of:

1. ADA - Americans with Disabilities Act
2. AISC - American Institute of Steel Construction
3. AISI - American Iron and Steel Institute
4. ANSI - American National Standards Institute
5. ASME - American Society of Mechanical Engineers
6. ASTME - American Society for Testing Materials
7. FCC - Federal Communications Commission
8. IEC - International Electronics Commission
9. NEC - The National Electric Code
10. NEMA - National Electrical Manufacturers Association
11. NFPA - National Fire Protection Association
12. OSHA - Occupational Safety and Health Association
13. SAE - Society of Automotive Engineers
14. TIA – Telecommunications Industry Association
15. SMPTE - Society of Motion Picture and Television Engineers
16. UL - Underwriters Laboratories (Electrical components, devices and accessories shall bear a UL label where applicable. UL listed and labeled as defined by NFPA70, article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.)
17. USITT- United States Institute for Theater Technology "Recommended Guidelines for stage rigging and stage machinery-specifications and practices".

B. Provide certification and labels where applicable. Comply with Federal, State, and Local regulations and applicable union regulations where required. All equipment will be furnished with the proper labels for New York State.

C. Provide only equipment that is standard new equipment, the latest model of regular stock product, and is furnished with all parts regularly used with the equipment offered for the purpose intended. The contractor guarantees that no modification of the equipment has been made contrary to the manufacturer's regular practice.

D. Review all materials and equipment prior to installation and notify owner as to any changes or discrepancies between published specifications and the actual material and equipment to be installed.

E. It is understood throughout this document that any referenced standards are intended to refer to the most current version of said standard (even if an older version of the standard is referenced).

1.13 EQUIVALENTS:

A. The successful bidder shall submit any product equivalents prior to award of the contract detailing the kind, type, brand, manufacturer or equipment included in the base bid. Equivalent products must be highlighted on this list. When requested, the successful bidder shall also submit information, describing in specific detail, how the equivalent bid material differs from the appearance, quality and performance required by the base specification. Submittal of the manufacturer's advertising cut sheets alone is not acceptable for proof of equivalency.

B. Proof of equivalency may require the bidder to provide physical samples, a full-sized mockup or specific manufacturer information detailing technical equivalency. Proof of equivalency shall be the burden of the submitting contractor/bidder and not that of the consultant. Proof of equivalency relates to all pertinent functions of the specified equipment, regardless of if that information is reflected on any manufacturer’s issued cut sheets.

C. If proposing equivalents that affect the system design as shown on the drawings, the bidder must submit flow charts, and any other drawings necessary to show differences in the system operation from the primary referenced system.

D. The bidder will pay for any and all changes to related work scope required by the equivalent products.

1. This includes electrical, architectural, structural and other changes that might be needed to implement an equivalent product.
   a. Some products with virtual identical functions have varying power requirements, physical dimensions etc.

E. The risk of whether bid equivalents will be accepted is borne by the contractor. See section 2.1 “Performance Requirements” for more information.

F. No equivalents will be considered after the Contract award unless specifically provided in the Contract Documents.

G. Final judgment as to equality will be solely that of the consultant, architect, construction manager and owner.

H. Equivalents must meet or exceed the specified product’s performance characteristics. No product shall be considered equivalent to the specified product if it has lesser performance characteristics in any critical area.

I. The costs for any changes by other trades required to implement the equivalents proposed will be borne by the contractor.

1.14 SUBMITTALS:

A. Equipment: After bid award but before ordering any equipment or starting any work submit to the owner for approval a list of all equipment to be furnished showing types, models, quantities and manufacturer. Attach catalog sheets for all items submitted.

B. Submit seven (7) copies of submission package, unless quantity of submission packages differs in front end contract documents. Contractor shall submit quantity of submission packages for each discipline as directed in front end documentation (or as indicated here if no quantities are indicated in front end contract documentation).

C. Submit seven (7) copies of material schedules and shop drawings for approval by the architect, consultant and owner prior to any fabrication or installation as follows:

1. Manufacturers cut sheets for all equipment
2. Drawings of proposed mounting methods for all equipment.
3. Samples or cut sheets for proposed marking systems for wire and equipment labeling.
4. Rack layouts, panel layouts and proposed labeling.
5. Schedule for submission of drawings for fabrication and site work.
6. The full set of submitted drawings and data sheets must be presented in a professional manner.
7. All shop drawings for submission must be CADD drawn (created with a computer aided drafting program). Hand drawings are not allowed. Illegible drawings shall not be acceptable.
8. All cut sheets for submission must be clean electronic (pdf) copies of the manufacturer’s actual data sheets. Mark up each sheet with highlights or boxes around submitted products, options, etc. No data sheets shall be acceptable that are illegible, poorly photocopied or hand marked up with scribbles, etc.

D. Intents:

1. The intent of the submittal package is that it contain one copy of the appropriate cut sheet for each item that the contractor is proposing to use on this project as well as a complete set of shop drawings that shows flow diagrams, rack layouts, wiring label samples & intents, plan, section and elevation views and details of the entire audio and A/V systems. There should be plan view drawings detailing speaker locations & dimensions, projection screen and other device locations. There should be detail drawings that show all typical attachment details, etc. as

well as all custom fabricated devices, suspension intentions, etc. The intent of the shop drawings is for the contractor to communicate to the consultant the exact proposed locations, materials and fabrication methods of all standard and custom items for all intended audio and A/V systems equipment. Submission of this package by the contractor is proof that the contractor has reviewed the entire system design, understands the intents and concurs that the designed system will actually function as laid out in the contract documents.

1.15 SYSTEM GENERAL DESCRIPTION

A. Auditorium Sound System

1. Automated and Manal Controls
2. Loudspeakers and processing
3. ADA Hearing Assistance System
4. Wireless microphones
5. Wiring
6. Tuning, Commissioning training and closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. The requirements of the referenced equipment are not generic in nature. Specific performance, control, and routing capabilities are necessary for any alternate equipment. The details set forth herein and within the functional description of the system are the critical criteria for selection of each piece of equipment.

B. In bidding equipment from manufacturers other than those referenced be aware that all functional information included in this specification as well as the manufacturer's specifications, physical size, serviceability, warranty terms, product availability, and other non technical issues may be determining factors in product equivalency. Final judgment as to equality will be solely that of the owner, architect, and consultant.

C. Substitution Criteria:

1. Loudspeakers substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Frequency Response – On and off axis
   b. Directivity by frequency
   c. Distortion
   d. Phase response
   e. Number of Drivers
   f. Power Handling Capacity and Maximum Output
   g. Weight
   h. Physical size
   i. Rigging options
   j. Powering method
2. Amplifiers require proof substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Power at all impedances.
   b. Damping Factor
   c. Slew rate
   d. Terminal types
   e. Indicator and control capabilities
   f. Ability to install with security covers
   g. Sonic Character
   h. Input Power requirements
   i. Cooling Method – Fan speed and air flow direction.

j. Weight
k. Physical size
l. Heat Output

3. Digital Signal Processors substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. A/D Converters type and sampling rate
   b. Number of Processors, Mixers, automixer, feedback Suppressors, equalizers, and dynamics devices.
   c. FIR Capability where required by design.
   d. Expandability where applicable
   e. Configuration Capability – Ability to configure as per the specified model.
   f. Interface to other devices digitally where applicable.
   g. Physical Size
   h. Terminals
   i. Input delay
   j. Control software and ability to be controlled via wireless.
4. Mixing Console substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. A/D Converters type and sampling rate
   b. Number of inputs/outputs and types
   c. Number of EFX processors, equalizers, and dynamics devices.
   d. Ability to create custom pages and configuration via preset scene change.
   e. Input Delay
   f. Fade Rate by scene
   g. Expandability where applicable
   h. Configuration Capability – Ability to configure as per the specified model.
   i. Interface to other devices digitally where applicable.
   j. Physical Size
   k. Connect ability
   l. Control software and ability to be controlled via external computer and wireless.
5. Microphone Substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Frequency response
   b. Pattern Consistency
   c. Capsule Type
   d. On/Off switch (or the lack of one).
   e. Physical Size.
   f. Color options
   g. Connector size, type and connections
6. Wire substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Jacket Type
   b. Number of Conductors
   c. Jacket Shape – i.e. round, twisted etc…
   d. Number of strands and gauge
   e. Flexibility
   f. Capacitance and resistance conductor-to-conductor as well as single conductor.

D. No contractor-manufactured products will be acceptable in place of referenced items except for those items enumerated in this specification as "custom".

E. The current manufacturer's data sheet for each referenced piece of equipment in force at the date of printing of this specification will be the basis for the specifications of the referenced equipment.

F. Any product accessories such as power supplies; rack mount kits, connectors, adapters, or other small items are the responsibility of the contractor whether or not they are called out in detail within these specifications.

G. Specification details are provided only for the features required for current and intended future uses of the products.

H. Quantities:

1. Where no quantity is indicated the contractor will supply quantities as indicated on drawings.

I. Options

1. If specific options are not identified with quantities the contractor will provide the product with all options.
2. Provide all miscellaneous batteries, power supplies, or other items not noted required for system function.

J. Items not indicated on drawings but necessary for project completion will be provided as required for project execution at no additional cost.

2.2 ELECTRONICS:

A. All AC or DC powered hardwired electronic equipment is to meet the following minimum specifications unless otherwise noted:

1. All inputs and outputs will be floating active balanced or transformer balanced. All transformer balancing is to be integral not via outboard transformers. Quasi balanced, ground referenced, or other configurations are not acceptable under this specification.
2. All electronics must carry UL and or CSA approval.
3. All electronics are to employ RFI filtration on inputs and outputs.
4. Input Impedance Range: 10K - 50 K Ohms Balanced
5. Microphone Inputs: ≤150 Ohms Balanced
6. Input Levels: Line inputs +18dB with No Overload
7. Output Levels: Line Outputs + 18dB with No Overload. Output Impedance Range: 50 - 600 Ohms Balanced
8. THD + Noise: < .05 % typical. Hum & Noise > 105dB A
9. EIN: -90 dB (-128 dB Microphone inputs) typical
10. S/N Ratio: 90 dB typical
11. Phantom Power Systems: +48V typical
12. Modular Construction: All equipment is to be provided as serviceable modular style circuitry: i.e. replaceable parts, modules, etc. Devices which utilize a single circuit board for all parts without provision for socketed chips, removable sub assemblies etc. are not allowable under this specification.
13. Multi function units may not be substituted for individual equipment types. i.e. a cassette/CD unit may not be substituted for a separate cassette and CD player. Mixer amplifiers may not be substituted for mixers with separate amplifiers. multi unit (common power supply) wireless systems may not be substituted for single unit wireless systems.

2.3 DIGITAL CONSOLES

A. 40 CHANNEL 25 BUS DIGITAL CONSOLE: REFERENCED PRODUCT MIDAS M32

1. Processing
   a. Input Channels: 32 input channels, 8 aux channels, 8 FX return channels
   b. Output Channels: 8 / 16
   c. Buses: 16 aux buses, 6 matrices, main LRC: 100
   d. Effects Engine: 8 / 16, (True Stereo / Mono)

e. Automation: Internal Show Automation (Structured Cues / Snippets): 500 / 100
f. Scenes: Internal Total Recall Scenes (Incl. Preamplifiers and Faders): 100
g. Signal Processing: 40-bit floating point
h. A/D and D/A Conversion:
   1) A/D Conversion (8-channel, 96 kHz Ready): 24-bit, 114 dB dynamic range, A-weighted
   2) D/A Conversion (stereo, 96 kHz Ready): 24-bit, 120 dB dynamic range, A-weighted
i. Latency
   1) 0.8 ms, (I/O, console input to output)
   2) 1.1 ms, (network latency, stage box in > console > stage box out)

2. Connectors
   a. Preamplifier Midas PRO Series Microphone Preamplifiers (XLR): 16
   b. Talkback Talkback Microphone Input (XLR): 1
   c. RCA RCA Inputs / Outputs: 2 / 2
   d. Audio Out (XLR) XLR Outputs: 8
   e. Monitoring Outputs Monitoring Outputs (XLR / ¼" TRS Balanced): 2 / 2
   f. Auxiliary Aux Inputs/Outputs (¼" TRS Balanced): 6 / 6
   g. Headphones Phones Output (¼" TRS): 1 (Stereo)
   h. Networking AES50 Ports (Klark Teknik SuperMAC): 2
   i. Ultranet P-16 Connector (No Power Supplied): 1
   j. Expansion Expansion Card Interface: 32 Channel Audio Input / Output
   k. MIDI MIDI Inputs / Outputs: 1 / 1
   l. USB USB Type A (Audio and Data Import / Export): 1
   m. USB Type B: 1, rear panel, for remote control
   n. Ethernet RJ45: 1, rear panel, for remote control
3. Microphone Inputs
   a. Design Midas PRO Series
   b. THD+N THD+N (0 dB gain, 0 dBu output): <0.01% unweighted
   c. THD+N (+40 dB gain, 0 to +20 dBu output): <0.03% (unweighted)
   d. Input Impedance Input Impedance (Unbalanced / Balanced): 10 kOhms / 10 kOhms
   e. Maximum Input Level Non-Clip Maximum Input Level: +23 dBu
   f. Phantom Power +48 V, (switchable per input)
   g. Equivalent Input Noise @ +45 dB gain (150 ohm source): -125 dB (22 Hz - 22 kHz, unweighted)
   h. CMRR CMRR @ Unity Gain (Typical): >70 dB
   i. CMRR @ 40 dB Gain (Typical): >90 dB
4. Input/Output
   a. Frequency Response @ 48 kHz Sample Rate: 0 to -1 dB (20 Hz - 20 kHz)
   b. Dynamic Range
      1) Analog In to Analog Out: 106 dB (22 Hz - 22 kHz, unweighted)
      2) A/D, Preamplifier and Converter (Typical): 109 dB (22 Hz - 22 kHz, unweighted)
      3) D/A, Converter and Output (Typical): 109 dB (22 Hz - 22 kHz, unweighted)
   c. Crosstalk Rejection: Typically @ 1 kHz 100 dB, adjacent channels
   d. Output Level: XLR Connectors (Nominal / Maximum): +4 dBu / +21 dBu
   e. Output Impedance
      1) XLR Connectors (Unbalanced / Balanced): 50 ohms / 50 ohms
      2) TRS (Unbalanced / Balanced): 50 ohms / 50 ohms
      3) Phones Output Impedance / Maximum output Level: 40 ohms / +21 dBu (Stereo)

f. Input Impedance: TRS Connectors (Unbalanced / Balanced): 20 kOhms / 40 kOhms
g. Maximum Input Level: Non-Clip Maximum Input Level, TRS Connectors: +21 dBu
h. Output Level: TRS (Nominal / Maximum): +4 dBu / +21 dBu
i. Residual Noise
1) Residual Noise Level, Out 1-16 XLR Connectors, Unity Gain: -85 dBu 22 Hz - 22 kHz unweighted
2) Residual Noise Level, Out 1-16 XLR Connectors, Muted: -88 dBu 22 Hz - 22 kHz unweighted
3) Residual Noise Level, TRS and Monitor out XLR Connectors: -83 dBu 22 Hz - 22 kHz unweighted

5. Display
a. Screens Main Screen: 5" TFT LCD, 800 x 480 resolution, 262 k colors
b. Channel LCD Screen: 128 x 64 LCD with RGB color backlight
c. Main Meter: 18-segment (-45 dB to clip)
6. Power
a. Power Supply Switch-Mode Power Supply: Auto-ranging 100 - 240 VAC (50 / 60 Hz) ±10%
b. Power Consumption 70 W
7. Physical
a. Operating Temperature 41 - 104°F (5 - 40°C)
b. Dimensions 18.8 x 24.3 x 8.2" (478 x 617 x 208 mm)
c. Weight 31.5 lb (14.3 kg)

2.4 DIGITAL STAGEBOXES

A. 16X8 AES50 REMOTE INPUT/OUTPUT STAGEBOX: REFERENCED PRODUCT MIDAS DL16

1. Front Panel Connections
a. Microphone Inputs 16 XLR male 3-pin, Neutrik
2. + 48 V phantom powered
a. Outputs (Analog) 8 XLR female 3-pin, Neutrik
3. Dual ADAT
a. Preamps 16 Midas PRO
b. MIDI I/O For directional communication
c. Monitoring Ultranet personal monitoring system
d. Headphones 1 x 1/4" (6.3 mm) TRS
e. Network AES ports with Klark Teknik SuperMAC technology
f. Network Cables CAT5/5e for up to 328' (100 m)
g. Power Supply Auto-ranging universal switch-mode power supply

2.5 DSP PROCESSORS

A. DIGITAL MATRIX PROCESSOR: REFERENCED PRODUCT ALLEN & HEATH AHM-32

1. The unit shall be a 1u rack-mountable digital matrix processor, capable of 32 input channels and 32 output channels, all independently assigned.
2. The unit shall operate at 96kHz sample rate and employ FPGA technology for digital signal processing. The system latency from analogue input to output shall not exceed 1ms.
3. All input channels shall be configurable mono/stereo and have access to any local or remote input. Output channels shall be configurable as mono/stereo zones or as speaker processing outputs with 2, 3 or 4-way Crossovers, allowing up to 32 mono zones / 16 stereo zones, or any combination of zones and speaker processing outputs not exceeding 32 total channels.

4. All input channels shall provide the following processing: Trim, Polarity, Gate, Insert point, 8- band Parametric EQ, Compressor, Delay and Automatic Mic Mixing (AMM).
5. All zones shall provide the following processing:
   a. Source Selector, Insert point, 8-band Parametric EQ, 28-band GEQ, Compressor, Delay, Ambient Noise Compensation (ANC) and Limiter.
6. All speaker processing outputs shall provide the following processing: Crossover filters with selectable filter type and slope, PEQ/GEQ, Delay and Limiter.
7. All output channels shall be routable to any local or remote output.
8. The 8-band Parametric EQ shall provide Bell, Constant Q, Shelving, LPF, HPF and Notch filter types selectable per band.
9. The unit shall have 12 balanced inputs on pluggable Phoenix terminal blocks. Each input shall have independent gain control with +60dB of gain, a -20dB active PAD and +48V phantom power.
10. The unit shall have 12 balanced outputs on pluggable Phoenix terminal blocks with a nominal level of +4dBu.
11. The routing matrix mixer shall be capable of mixing all inputs to all zones, as well as all zones to other zones.
12. The unit shall provide Automatic Mic Mixing (AMM) of up to 32 microphone sources into 1, 2 or 4 zones. The AMM shall be capable of running in classic gain sharing mode or optionally as a NOM (Number of Open Microphones) algorithm. The unit shall offer a slot for optional processing modules including Acoustic Echo Cancellation.
13. An RJ45 Control Network port shall be provided on the rear of the unit for connection to System Manager software, IP remote controllers, Custom Control app and TCP control.
14. One 128x128 I/O port for optional digital interface
15. modules shall be provided. A Dante optional module shall provide a minimum of 32x32 I/O at 96kHz, and be compliant with AES67 and Dante Domain Manager. An SLink optional module shall be available for Ethernet audio expansion, supporting multiple Audio-over-Ethernet protocols and providing access to up to 128x128 I/O.
16. The unit shall provide the facility to save 500 presets. The presets shall be nameable and a descriptive text entry per preset provided. A crossfade of up to 20 seconds shall be available to apply to any combination of Inputs, Zones, Groups, Input/Zone Crosspoints and Zone/Zone Crosspoints.
17. The unit shall provide the facility to save 50 events. The events shall be nameable and should allow for the scheduled recall of presets at a specified time on specific days, or every day, with the option for the event to be triggered repeatedly or just once.
18. The unit shall allow the creation and storage of up to 16 user profiles, each with an editable name and password.
19. The unit shall allow the connection of two general purpose inputs, and two general purpose relay outputs, via pluggable Phoenix connectors on the rear of the chassis. Each input connector shall allow analogue control of Mutes, Levels, Preset Recall, Custom MIDI via a 0-10V control signal. Output 1 shall support normally closed and normally open operation, and output 2 shall support normally open operation. The outputs shall be configurable to respond to Mutes, Preset Recalls, and Level Sensing. An optional 8x8 networkable GPIO interface shall be available for expansion of the GPIO functionality.
20. Networkable, PoE-enabled remote controllers shall be available to complement the unit, including wallplate controllers in both US and EU formats, and desktop controllers with a minimum of 8 motorised faders and 8 LCD displays.
21. The unit shall have an integrated power supply accepting AC mains voltages of 100-240V, 50/60Hz, 70W max via an earthed 3-pin IEC male connector mounted on the rear chassis.

2.6 8 CHANNEL MOTORIZED FADER REMOTE: REFERENCED PRODUCT ALLEN & HEATH IP8

A. The remote controller shall be compact and portable with 8 motorised faders, 8 LCD displays, 23 backlit softkeys and a dimmable pre-set control for all displays.

B. The faders shall be fully assignable, configured individually or part of a vertical strip. There shall be 6 layers of control, accessed via softkeys, allowing control of 48 individual channels.

C. There shall be a fast Ethernet connection via a locking Neutrik EtherCon connector and a 12V DC inlet connector on the rear of the unit.

D. Connection of the controller shall be direct to the dLive Mixrack/Surface, Avantis mixer or AHM-64 Matrix Processor via standard Cat5 data infrastructure.

E. Alternatively, it shall be capable of multiple parallel connections using an Ethernet switch.

F. Configuration and programming of the controller shall be via AHM System Manager or dLive Director Software (PC or Mac), or via an Avantis mixer or dLive Surface.

G. The controller shall be powered using a supplied 12V 2.1A power supply or by the Cat5 control cable via a PoE+ enabled device. The controller shall be compatible with PoE+ standard 802.3at (30W at source). The maximum power consumption of the controller shall be 25W.

H. The remote controller shall be used free standing or there shall be provision made to fix the unit permanently into furniture via six captive screws located on the underside of the unit.

I. Recommended operating temperature for the controller shall be 0 to 35 degrees Celsius.

J. The controller shall weigh no more than 2.5kg (5.5lbs)

2.7 MULTI-FUNCTION ROTARY ENCODER: REFERENCED PRODUCT ALLEN & HEATH IP1

A. The remote controller shall be of a fixed installation type with 1 rotary encoder and 1 LCD display.

B. The rotary encoder shall be dual function with the second function being accessed via a push and turn action.

C. There shall be a fast Ethernet connection via an RJ45 connector. Connection of the controller shall be direct to the dLive Mixrack/Surface, Avantis mixer or AHM-64 Matrix Processor via standard Cat5 data infrastructure.

D. Alternatively, it shall be capable of multiple parallel connections using an Ethernet switch. Configuration and programming of the controller shall be via AHM System Manager or dLive Director Software (PC or Mac), or via an Avantis mixer or dLive Surface.

E. The controller shall be powered by the Cat5 control cable via a PoE enabled device. The controller shall be compatible with both PoE standards 802.3af (15.4W at source) and 802.3at (30W at source). The maximum power consumption of the controller shall be 2.5W.

F. The remote controller shall be used wall/plinth mounted with multiple options to suit varying pattress box standards. These options shall include compatibility with Decora and Mk Elements faceplates when integrating with varying architectural finishes.

G. Recommended operating temperature for the controller shall be 0 to 35 degrees Celsius.

2.8 HIGH RESOLUTION LED-BACKLIT HANDHELD DISPLAY: REFERENCED PRODUCT APPLE IPAD

A. Provide the latest generation iPad device (color TBD by owner). Provide the storage capacity and configuration for the iPad as indicated on the contract drawings.

B. Physical:

1. Size: 9.56” H x 7.47” W x 0.5” D (242.8 mm x 189.7 mm x 13.4 mm)
2. Weight: 1.5 pounds (0.68 kg) Wi-Fi model; 1.6 pounds (0.73 kg) Wi-Fi + 3G model

C. Display:

1. 9.7-inch (diagonal) LED-backlit glossy widescreen Multi-Touch display with IPS technology
2. 1024-by-768-pixel resolution at 132 pixels per inch (ppi)
3. Fingerprint-resistant oleophobic coating
4. Support for display of multiple languages and characters simultaneously

D. Wireless and cellular:

1. Wi-Fi model:
   a. Wi-Fi (802.11a/b/g/n)
   b. Bluetooth 2.1 + EDR technology
2. Wi-Fi + 3G model
   a. UMTS/HSDPA (850, 1900, 2100 MHz)
   b. GSM/EDGE (850, 900, 1800, 1900 MHz)
   c. Data only
   d. Wi-Fi (802.11a/b/g/n)
   e. Bluetooth 2.1 + EDR technology
3. Location:
   a. Wi-Fi
   b. Digital compass
   c. Assisted GPS (Wi-Fi + 3G model)
   d. Cellular (Wi-Fi + 3G model)
4. Environmental:
   a. Arsenic-free display glass
   b. BFR-free
   c. Mercury-free LCD display
   d. PVC-free Recyclable aluminum and glass Enclosure
5. Capacity: 16GB, 32GB or 64GB flash drive
6. Processor: 1GHz Apple A4 custom-designed, high performance, low-power system-on-a-chip
7. Sensors:
   a. Accelerometer
   b. Ambient light sensor
8. Audio playback:
   a. Frequency response: 20Hz to 20,000Hz
   b. Audio formats supported: HE-AAC (V1), AAC (16 to 320 Kbps), Protected AAC (from iTunes Store), MP3 (16 to 320 Kbps), MP3 VBR, Audible (formats 2, 3, and 4), Apple Lossless, AIFF and WAV.
   c. User-configurable maximum volume limit.
9. TV and Video:
   a. Support for 1024 by 768 pixels with Dock Connector to VGA Adapter; 576p and 480p with Apple Component AV Cable; 576i and 480i with Apple Composite AV Cable.
   b. H.264 video up to 720p, 30 frames per second, Main Profile level 3.1 with AAC-LC audio up to 160 Kbps per channel, 48kHz, stereo audio in .m4v, .mp4 and .mov file formats; MPEG-4 video, up to 2.5 Mbps, 640 by 480 pixels, 30 frames per second, Simple Profile with AAC-LC audio up to 160 Kbps, 48kHz, stereo audio in .m4v, .mp4 and .mov file formats; Motion JPEG (M-JPEG) up to 35 Mbps, 1280 by 720 pixels, 30 frames per second, audio in ulaw, PCM stereo audio in .avi file format.
10. Mail attachment support:
    a. Viewable document types: .jpg, .tiff, .gif (images); .doc and .docx (Microsoft Word); .htm and .html (web pages); .key (Keynote); .numbers (Numbers); .pages (Pages); .pdf (Preview and Adobe Acrobat); .ppt and

.pptx (Microsoft PowerPoint); .txt (text); .rtf (rich text format); .vcf (contact information); .xls and .xlsx (Microsoft Excel).

11. Languages:
    a. Language support for English (U.S.), English (UK), French (France), German, Traditional Chinese, Simplified Chinese, Dutch, Italian, Spanish, Portuguese (Brazil), Portuguese (Portugal), Danish, Swedish, Finnish, Norwegian, Korean, Japanese, Russian, Polish, Turkish, Ukrainian, Hungarian, Arabic, Thai, Czech, Greek, Hebrew, Indonesian, Malay, Romanian, Slovak, Croatian, Catalan, and Vietnamese.
    b. Keyboard support for English (U.S.), English (UK), French (France), French (Canadian), French (Switzerland), German, Traditional Chinese (Handwriting, Pinyin, Zhuyin, Cangjie, Wubihua), Simplified Chinese (Handwriting, Pinyin, Wubihua), Dutch, Italian, Spanish, Portuguese (Brazil), Portuguese (Portugal), Danish, Swedish, Finnish, Norwegian, Korean, Japanese (Romaji, Fifty Key), Japanese (Kana), Russian, Polish, Turkish, Ukrainian, Estonian, Hungarian, Icelandic, Lithuanian, Latvian, Flemish, Arabic, Thai, Czech, Greek, Hebrew, Indonesian, Malay, Romanian, Slovak, Croatian, Bulgarian, Serbian (Cyrillic/Latin), Catalan, Vietnamese, Tibetan, Macedonian, and Cherokee.
    c. Dictionary support (enables predictive text and autocorrect) for English (U.S.), English (UK), French, German, Traditional Chinese, Simplified Chinese, Dutch, Italian, Spanish, Portuguese (Brazil), Portuguese (Portugal), Danish, Swedish, Finnish, Norwegian, Korean, Japanese (Romaji), Japanese (Kana), Russian, Polish, Turkish, Ukrainian, Hungarian, Lithuanian, Flemish, Arabic, Thai, Czech, Greek, Hebrew, Indonesian, Malaysian, Romanian, Slovak, Croatian, Catalan, Vietnamese, and Cherokee.
12. Accessibility:
    a. Support for playback of closed-captioned content
    b. Voice Over screen reader
    c. Full-screen zoom magnification
    d. White on black display
    e. Mono audio
13. Battery and power:
    a. Built-in 25-watt-hour rechargeable lithium polymer battery
    b. Up to 10 hours of surfing the web on Wi-Fi, watching video or listening to music
    c. Up to 9 hours of surfing the web using 3G data network
    d. Charging via power adapter or USB to computer system
14. Input and output:
    a. Dock connector port
    b. 3.5-mm stereo headphone jack
    c. Built-in speaker
    d. Microphone
    e. Micro-SIM card tray (Wi-Fi + 3G model only)
15. External buttons and controls: On/off, Sleep/wake, Mute, Volume and Up/down
16. Mac system requirements:
    a. Mac computer with USB 2.0 port
    b. Mac OS X v10.5.8 or later
    c. iTunes 10.1 or later
    d. iTunes Store account
    e. Internet access
17. Windows system requirements:
    a. PC with USB 2.0 port
    b. Windows 7; Windows Vista; or Windows XP Home or Professional with Service Pack 3 or later
    c. iTunes 10.1 or later

d. iTunes Store account
e. Internet access

18. Environmental requirements:
    a. Operating temperature: 32° to 95° F (0° to 35° C)
    b. Non-operating temperature: -4° to 113° F (-20° to 45° C)
    c. Relative humidity: 5% to 95% non-condensing
    d. Maximum operating altitude: 10,000 feet (3000 m)
19. Accessories: Provide with (1) iPad dock, (1) iPad keyboard dock, (1) iPad foldable stand case, (1) dock connector to USB cable and (1) iPad 10 Watt USB power adapter and all manufacturer's accompanying documentation. Provide with all necessary connectors, cables, etc. as needed in order to interface iPad with the computer, keyboard, dock, etc.

2.9 28 PORT GIGABIT POE+ MANAGED SWITCH: REFERENCED PRODUCT LUXUL AMS-1208P

A. Standards

1. IEEE 802.3, IEEE 802.3u, IEEE 802.3z, IEEE 802.3ab, IEEE 802.3af, IEEE 802.1D, IEEE 802.3x IEEE 802.1P, IEEE 802.1Q, IEEE 802.1X

B. Interface

1. RJ-45
    a. 10 Base-T: Cat.5 UTP /STP
    b. 100 Base-TX: Cat.5 UTP /STP
    c. 1000Base-T: Cat.5, Cat.5e or Cat.6 UTP/STP
2. Gigabit Fiber Uplinks on SFP ports
3. Ethernet Cable Recognition for Straight-through or Crossover Cables

C. Surge Protection

1. The RJ45 port surge protection is tested to: EN61000-4-5 (for RJ45 Port, Surge 6KV)

D. LEDS

1. Front
    a. Per Unit: Power
    b. Per Port: Link/Activity
    c. Dual color, user selectable
2. Back
    a. Per Port: Link/Activity
    b. 10/100/1000

E. Power Budget

1. 250 Watts

F. Max Power Consumption

1. 337W

G. Power

1. Internal Switched Power, AC 100-240V, 50-60Hz input

H. VLAN

1. 802.1Q Max 4094 VIDs & VLAN Trunking
2. Supports 1 Management VLAN

I. Quality of Service (QoS)

1. 4 Queues per port
2. Queue Handling: Strict, Weighted Round Robin (WRR)
3. CoS Based on DCSP, 802.1P

4. Port- based Bandwidth Control

J. Network Data Transfer Rate

1. Ethernet: 10Mbps (Half-duplex)
2. Ethernet: 20Mbps (Full-duplex)
3. Fast Ethernet: 100Mbps (Half-duplex)
4. Fast Ethernet: 200Mbps (Full-duplex)
5. Gigabit Ethernet: 1000Mbps (Half-duplex)
6. Gigabit Ethernet: 2000Mbps (Full-duplex

K. Layer 3

1. Layer 3 Static Routing

L. Operating Temperature

1. 32°F to 104ºF (0°C to 40°C)

M. Operating Humidity

1. 10% to 90% (Non-condensing)

N. Dimensions LxWxH in. (mm)

1. 17.3”(439.5) x 8.25”(209.5) x 1.75”(44.5)

O. Weight lbs (kg)

1. 8.75 (3.96)

P. Certification

1. FCC, CE, RoHS

2.10 PASSIVE LOUDSPEAKERS

A. FULL RANGE THREE-WAY LOUDSPEAKER: REFERENCED PRODUCT DANLEY SOUND LABS SH-64I

1. The loudspeaker shall utilize 4 – 15” woofers, 4 – 4” mid frequency drivers and 1 – 1.4” high frequency driver in a patent-pending enclosure. The coverage pattern shall be 60° horizontal x 40° vertical. The loudspeaker shall have an operating rage of +/- 3 dB 65 Hz – 16 kHz. Sensitivity of 103 dBSPL @ 1m. Output of 135 dBSPL/138 dBSPL Peak. Power handling shall be 1400 Watts continuous, 2800 Watts program. The impedance shall be nominal 7.3 ohms.
2. The loudspeaker shall be constructed of 13 ply Baltic birch, water resistant Polyurea coated, properly braced for the intended use and a rugged steel grill. The connectors shall be Neutrik NL4.

B. FULL RANGE TWO-WAY LOUDSPEAKER: REFERENCED PRODUCT FULCRUM ACOUSTIC CX1226

1. Performance Specifications
   a. Operating Mode
      1) Single-amplified w/ DSP
   b. Operating Range
      1) 68 Hz to 18 kHz
   c. Nominal Beamwidth
      1) 120° x 60°
   d. Transducers
      1) HF/LF: Coaxial 3.0” titanium diaphragm compression driver;
      2) 12.0” woofer, 3.0” voice coil; single neodymium magnet
   e. Power Handling @ Nominal Impedance
      1) 57 V / 400 W @ 8 Ω
   f. Nominal Sensitivity @ Input Voltage (whole space)

1) 103 dB @ 2.83 V
g. Nominal Maximum SPL (peak / continuous)
1) 135 dB / 130 dB
h. Equalized Sensitivity @ Input Voltage
1) 98 dB @ 2.83 V
i. Equalized Maximum SPL (peak / continuous)
1) 130 dB / 124 dB
j. Recommended Power Amplifier
1) 400 W to 800 W @ 8 Ω
2. Physical Specifications
a. Connections
1) (2) Neutrik NL4 Speakon
a. Pin 1+/-: Full Range
b. Pin 2+/-: NC
b. Mounting / Suspension Points
1) (12) M10 x 1.5 eye bolt angle points, (2) M10 x 1.5 yoke points
c. Finish
1) Black painted enclosure w/ matte black grille, or
2) White painted enclosure w/ matte white grille

C. TAPPED HORN COMMERCIAL PRO SUBWOOFER LOUDSPEAKER: REFERENCED PRODUCT DANLEY SOUND LABS TH115

1. The loudspeaker shall utilize one 15” long excursion transducer in a patent-pending enclosure. The subwoofer shall have an operating range of -3 dB 38 Hz – 200 Hz with sensitivity of 106 dBSPL, 112 dBSPL @ 100Hz. 133 dBSPL/139 dBSPL peak 139 dBSPL/145 dBSPL @ 100Hz. Power handling shall be 1000 W continuous, 2000 W program. The impedance shall be nominal 4 ohms.
2. The loudspeaker shall be constructed of 13 ply Baltic birch, water resistant Polyurea coated, properly braced for the intended use and a rugged steel grill. The connectors shall be Neutrik NL4.

2.11 LOW IMPEDANCE MULTI-CHANNEL AMPLIFIERS

A. NETWORK AMPLIFIER: REFERENCED PRODUCT ASHLY NXE1.54

1. The unit shall be a 4 channel multi-mode amplifier capable of driving 2 Ohm loads at full power. The maximum rated output power shall be 1,500W per channel at Low Z and 70V modes, and 1,250W in 100V mode. There shall be an automatic but defeatable sleep mode consuming <1W, and instant standby mode controlled by contact closure or software. A switch mode power supply shall auto-detect 110 – 120VAC or 220 – 240VAC mains, and a Neutrik® powerCON shall be used for the AC cord. Each channel shall have selectable output mode of Low Z, 70V, or 100V, an 80Hz high-pass filter, input limiter, and input gain settings of 26dB, 32dB, 38dB, or 1.4V. Each channel shall have remote DC level control. Input connectors shall be Neutrik® XLR/TRS combo jack and Euroblock, while output connectors shall be Neutrik® speakON. The unit shall have a front panel power switch and level controls that can be disabled. LEDs shall indicate Protect, Sleep, Disabled, Com, and Bridge mode status, as well as Temperature, Output Current, Output Signal, and Clipping/Mute status per channel. The unit shall have Ethernet control with a real-time clock for event scheduling. The unit shall have serial data remote control, aux preamp outputs, preset control, fault condition logic outputs, optional network audio and AES3 digital audio capability with the addition of a 4-Channel DAC card. The amplifier shall have temperature dependent variable speed forced-air cooling. The unit shall weigh <28.7 lbs (13kg), measure 19”W x 3.5”H x 16.8”D (483mm x 89mm x 428mm), and mount in a standard 19” rack. There shall be a five year warranty for units purchased in the US. No other unit shall be acceptable unless all specifications represented herein are met or exceeded and submitted in writing by an independent testing agent.

B. NETWORK AMPLIFIER: REFERENCED PRODUCT ASHLY NXP8004

1. The unit shall be a 4 channel multi-mode amplifier capable of driving 2 Ohm loads at full power. The maximum rated output power shall be 800W per channel at Low Z, 70V, and 100V mode. There shall be an automatic but defeatable sleep mode consuming <1W, and instant standby mode controlled by contact closure or software. A switch mode power supply shall auto-detect 110 – 120VAC or 220 – 240VAC mains, and a Neutrik® powerCON shall be used for the AC cord. Each channel shall have selectable output mode of Low Z, 70V, or 100V, an 80Hz high-pass filter, input limiter, and input gain settings of 26dB, 32dB, 38dB, or 1.4V. Each channel shall have remote DC level control. Input connectors shall be Neutrik® XLR/TRS combo jack and Euroblock, while output connectors shall be Neutrik® speakON. The unit shall have a front panel power switch and level controls that can be disabled. LEDs shall indicate Protect, Sleep, Disabled, Com, and Bridge mode status, as well as Temperature, Output Current, Output Signal, and Clipping/Mute status per channel. The unit shall have Ethernet control with a real-time clock for event scheduling. The unit shall have serial data remote control, aux preamp outputs, preset control, fault condition logic outputs, optional network audio and AES3 digital audio capability with the addition of a 4-Channel DAC card. The amplifier shall have temperature dependent variable speed forced-air cooling. The unit shall weigh <25.9 lbs (11.7kg), measure 19”W x 3.5”H x 16.8”D (483mm x 89mm x 428mm), and mount in a standard 19” rack. There shall be a five year warranty for units purchased in the US. No other unit shall be acceptable unless all specifications represented herein are met or exceeded and submitted in writing by an independent testing agent.

2.12 MICROPHONES AND ACCESSORIES:

A. UHF DIGITAL WIRELESS MICROPHONE SYSTEM: REFERENCED PRODUCT SHURE QLXD SERIES

1. System Specifications
   a. RF Carrier Range
      1) 470–937.5MHz, varies by region
   b. Working Range
      1) 100 m (328 ft)
   c. RF Tuning Step Size
      1) 25 kHz, varies by region
   d. Image Rejection
      1) >70 dB, typical
   e. RF Sensitivity
      1) -97 dBm at 10−5 BER
   f. Latency
      1) <2.9 ms
   g. Audio Frequency Response
      1) QLXD1: 20 Hz – 20 kHz (±1 dB)
      2) QLXD2: Note: Dependent on microphone type
   h. Audio Dynamic Range System (Gain @ +10)
      1) >120 dB, A-weighted, typical
   i. Total Harmonic Distortion (-12 dBFS input, System Gain @ +10)
      1) <0.1%
   j. System Audio Polarity
      1) Positive pressure on microphone diaphragm produces positive voltage on pin 2 (with respect to pin 3 of XLR output) and the tip of the 6.35 mm (1/4-inch) output.
   k. Operating Temperature Range
      1) -18°C (0°F) to 50°C (122°F)
   l. Storage Temperature Range

1) -29°C (-20°F) to 74°C (165°F)

2. UHF DIGITAL RECEIVER: SHURE QLXD4
   a. Dimensions
      1) 41 × 197 × 151 mm (1.63 × 7.75 × 5.94 in.), H × W × D
   b. Weight: 777 g (1.71 lbs), without antennas
   c. Housing: Steel
   d. Power requirements: 12 V DC @ 0.4 A, supplied by external power supply (tip positive)
   e. RF Input
      1) Spurious Rejection: >80 dB, typical
      2) Connector Type: BNC
      3) Impedance: 50 Ω
   f. Audio Output
      1) Gain Adjustment Range: -18 to +42 dB in 1 dB steps
      2) Configuration:
         a. 1/4" (6.35 mm): Impedance balanced (Tip=audio, Ring=no audio, Sleeve=ground)
         b. XLR: Balanced (1=ground, 2=audio +, 3=audio −)
      3) Impedance:
         a. 1/4" (6.35 mm): 100 Ω (50 Ω Unbalanced)
         b. XLR: 100 Ω
      4) Full Scale Output
         a. 1/4" (6.35 mm): +12 dBV
         b. XLR: LINE setting= +18 dBV, MIC setting= −12 dBV
      5) Mic/Line Switch: 30 dB pad
      6) Phantom Power Protection
         a. 1/4" (6.35 mm): Yes
         b. XLR: Yes
   g. Networking
      1) Network Interface: Single Port Ethernet 10/100 Mbps
      2) Network Addressing Capability: DHCP or Manual IP address
      3) Maximum Ethernet Cable Length: 100 m (328 ft)
3. UHF DIGITAL HANDHELD TRANSMITTER: SHURE QLXD2
   a. Mic Offset Range: 0 to 21 dB (in 3 dB steps)
   b. Battery Type: Shure SB900 Rechargeable Li-Ion or AA batteries 1.5 V
   c. Battery Runtime (@ 10 mW): Shure SB900: up to 10 hours Alkaline: up to 9 hours
   d. Dimensions: 256 mm × 51 mm (10.1 in. × 2.0 in.) L × Dia.
   e. Weight: 347 g (12.2 oz.), without batteries
   f. Housing: Machined aluminum
   g. Audio Input
      1) Configuration: Unbalanced
      2) Maximum Input Level 1 kHz at 1% THD: 145 dB SPL (SM58)
   h. RF Output
      1) Antenna Type: Integrated Single Band Helical
      2) Occupied Bandwidth: <200 kHz
      3) Modulation Type: Shure proprietary digital
      4) Power: 1 mW or 10 mW
      5)
4. UHF DIGITAL BODYPACK TRANSMITTER: SHURE QLXD1
   a. Mic Offset Range: 0 to 21 dB (in 3 dB steps)
   b. Battery Type:
      1) Shure SB900 Rechargeable Li-Ion
      2) AA batteries 1.5 V
   c. Battery Runtime @ 10 mW:
      1) Shure SB900: up to 10 hours
      2) Alkaline: up to 9 hours

d. Dimensions: 3.38in.×2.57in.×0.92in. (H×W×D)
e. Weight: 138 g (4.9 oz.), without batteries
f. Housing: Cast aluminum
g. Audio Input
    1) Connector: 4-pin male mini connector (TA4M)
    2) Configuration: Unbalanced
    3) Impedance: 1 MΩ
    4) Maximum Input Level 1kHz @ 1%THD: 8.5 dBV (7.5 Vpp)
    5) Preamplifier Equivalent Input Noise (EIN) System Gain Setting ≥ +20: −120 dBV, A-weighted, typical
h. RF Output
    1) Connector: SMA
    2) Antenna Type: ¼ wave
    3) Impedance: 50 Ω
    4) Occupied Bandwidth: <200 kHz
    5) Modulation Type: Shure proprietary digital
    6) Power: 1 mW or 10 mW

2.13 1000VA UPS BACKUP: REFERENCED PRODUCT MID ATLANTIC UPS-1000R

A. Rackmount UPS shall operate on 120 VAC/60Hz current. Rackmount UPS shall have a nominal output of 120V. Rackmount UPS shall have a capacity of 1000 VA and 600 W (refer to chart). Rackmount UPS shall have 6 NEMA 5-15R receptacles on the rear of the unit. Rackmount UPS shall have a priority outlet bank consisting of 3 outlets dedicated to ensure maximum run time of critical components. Rackmount UPS shall have a non-critical outlet bank consisting of 3 outlets dedicated to load shedding. Rackmount UPS shall have a simulated sine wave output waveform. Rackmount UPS shall have an 8ms transfer time. Rackmount UPS shall be IP enabled when used with option IP Expansion card, model# UPS-IPCARD. Rackmount UPS shall include a 10’ 15A power cord with NEMA 5-15 plug. Rackmount UPS shall have surge suppression that utilizes a clean line-to-neutral design that does not pass noise contamination to ground. Rackmount UPS shall allow for a 13 minute run time at half load and a 3 minute run time at full load. Rackmount UPS shall be RoHS EU Directive 2002/95/ EC & 2011/65/EU compliant. Rackmount UPS shall utilize Middle Atlantic Power Manager™ software. Rackmount UPS shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years; battery shall be warrantied for a period of 2 years. Rackmount UPS shall be UL listed in US and Canada.

2.14 RF HEARING ASSISTANCE SYSTEMS: REFERENCED PRODUCT LISTEN TECHNOLOGIES LP-8-216

A. RF HEARING ASSISTANCE TRANSMITTER: REFERENCED PRODUCT LISTEN TECHNOLOGIES LT-800/216

1. The stationary RF transmitter shall be capable of broadcasting on 57 channels. The transmitter shall have an SNR of 70 dB or greater. The output power shall be adjustable to quarter, half or full. Channel tuning shall be capable of being locked. The device shall have an audio frequency response of 50 Hz to 15k Hz, ± 3 dB at 216 MHz. It shall have two (2) mixing audio inputs and a mixed signal output. The device shall have the following audio controls: input level, mix level and an adjustable low pass filter (contour). The device shall have an audio processor that is capable of automatic gain control and limiting.

B. RF HEARING ASSISTANCE RECEIVER: REFERENCED PRODUCT LISTEN TECHNOLOGIES LR-4200-216

1. The RF receiver shall be capable of receiving on 57 wide and narrow band channels. The device shall tune to a single channel and user shall not be able to change the channel. The receiver shall have a signal-to-noise ratio of 70 dB or

greater and shall have an audio frequency response of 50 Hz – 15 kHz (±3 dB). The device shall employ a unique DSP SQTM noise reduction technology. The unit shall have a programmable squelch circuit. The unit shall incorporate a multi-functional display that indicates battery status, inventory number and channel. The device shall have the option of being lanyard or belt clip worn and the lanyard shall have the option of an integrated neck loop. The device shall have a USB connector used for inventory control, set up, charging and firmware upgrades. The device shall incorporate automatic battery charging circuitry and use a non-proprietary lithium ion battery. The device shall have additional charging contacts to allow multiple charging options.

C. CHARGING/CARRYING CASE: REFERENCED PRODUCT LISTEN TECHNOLOGIES LA-380

1. The LA-380-01 Intelligent 12-unit charging/carrying case shall be capable of transport, charging and storing up to 12 intelligent products. The unit shall accept an input voltage of 100 to 240AC, 50/60 H and shall deliver 5.0 VCD, 8 A at 40 watts. The unit shall be capable of being locked. The unit shall have equivalent compliance with UL, CE and RoHS.

D. DUAL EARBUD HEADPHONES: REFERENCED PRODUCT LISTEN TECHNOLOGIES LA-405

1. The LA-405 Universal Stereo Ear Buds shall provide an audio response of 20 Hz to 20 KHz with an impedance of 32 ohms. The device shall be easy to put on, easy to clean and shall provide a cable length of 13 in (33 cm) that reduces cable tangling. The device shall have replaceable foam cushions.

2.15 RACKS, FURNITURE, AND HARDWARE

A. WELDED METAL DESKTOP RACK: REFERENCED PRODUCT MIDDLE ATLANTIC DTRK SERIES.

1. EIA compliant 19” desktop/under-desk equipment rack shall have a useable depth of 18-1/2”. DTRK shall come equipped with two pairs of steel rackrail with tapped 10-32 mounting holes in universal EIA spacing, black e-coat finish and numbered rackspaces. Sides of DTRK shall feature vertical slotted vent pattern for ventilation. DTRK shall accept patent-pending LeverLock™ tool free and hardware free internal cable and device management system accessories when used with optional LL-DTRK adapter (10 space + only). DTRK shall be of fully welded construction. DTRK shall be finished in an environmentally friendly, durable metallic grey powdercoat. Fully welded construction shall provide a static capacity of 1,200 lbs. and a UL Listed load capacity of 300 lbs. DTRK shall be UL Listed in the US and Canada. DTRK shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. DTRK enclosure shall comply with the requirements of RoHS EU Directive 2002 / 95 / EC compliant. DTRK shall be manufactured by an ISO 9001 and ISO 14001 registered company. DTRK enclosure shall be warrantied to be free from defects in material or workmanship under normal use and conditions for the lifetime of the rack.

B. RACK DRAWERS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO D SERIES.

1. EIA compliant 19” rackmount drawer shall have a useable depth of 14-1/2”. Drawer base shall be 20-gauge steel, top and sides shall be 16-gauge steel. Drawer faceplate shall be .090” thick aluminum with a black brushed & anodized finish. Drawer shall use full extension, ball bearing slides. Grommet shall be provided for safely passing cables through the cable entry point at the rear of the drawer on 2, 3 and 4 space models. 2, 3 and 4 space drawers shall include a no-slip drawer mat. Drawer shall have a 50 lb. weight capacity.

2. Drawer shall be warrantied to be free from defects in materials or workmanship under normal use and conditions for a period of three years. Drawer shall be UL Listed in the US and Canada.
3. Drawer shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. Drawer shall be RoHS EU Directive 2002/95/EC compliant. Drawer shall be manufactured by an ISO 9001 and ISO 14001 registered company.

C. VENT PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC VT SERIES

1. EIA compliant 19” vent panels shall be constructed of 16-gauge perforated steel and shall have a black powdercoat finish. Vent panel shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. Vent panel shall be RoHS EU Directive 2002/95/EC compliant. Vent panel shall be manufactured by an ISO 9001 and ISO 14001 registered company. Vent panel shall be warrantied to be free from defects in material or workmanship under normal use and conditions for the lifetime of the product.
2. Perforations
   a. Perforation pattern shall be: 5/32” dia. hole, with 3/16” staggered centers Open Area 64%

D. BLANK PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC BL SERIES

1. Blank panels shall be constructed of 1/16” thick aluminum. Blank panels shall be RoHS EU Directive 2002/95/EC compliant. Blank panels shall be manufactured by an ISO 9001 and ISO 14001 registered company. Blank panels shall be warrantied to be free from defects in material or workmanship under normal use and conditions for the lifetime of the panel.

2.16 INSTALLATION WIRE STANDARDS: ALL WIRE IN OR OUT OF CONDUIT WILL BE TYPE CL2-CL3 UNLESS OTHERWISE REQUIRED BY NEC AND JOB SITE CONDITIONS. PORTABLE CABLE EXCLUDED.

A. WIRE - INSTALLED LINE LEVEL:

1. WP 293 - Conductor Gauge: 2 - 18 AWG. Strands: 7 x 26 tinned copper. Insulation: .010” PVC. Shield: Aluminum polyester foil with 100% coverage. Drain Wire: 20 strand tinned copper. Capacitance between conductors: 68 pf/FT.

B. WIRE - INSTALLED MICROPHONE LEVEL:

1. WP 293 - Conductor Gauge: 2 - 18 AWG. Strands: 7 x 26 tinned copper. Insulation: .010” PVC. Shield: Aluminum polyester foil with 100% coverage and TC drain wire. Drain Wire: 20 strand tinned copper. Capacitance between conductors: 68 pf/FT.
2. WP 291 - Conductor Gauge: 2 - 22 AWG. Strands: 7 x 30 tinned copper. Insulation: .010” PVC. Shield: Aluminum polyester foil with 100% coverage and TC drain wire. Drain Wire: 24 strand tinned copper. Capacitance between conductors: 55 pf/FT.
3. Microphone level wiring will be run as follows: WP 291 CL3 - 22 AWG (or equal as referenced above) is to be used for runs $\leq$ 100 feet. WP 293 CL3 - 18 AWG (or equal as referenced above) is to be used for runs in excess of 100 feet.

C. MICROPHONE CABLE PORTABLE: REFERENCED PRODUCT PRO CO M SERIES WITH 223 B CABLE

1. Conductor Gauge: 23 AWG. Strands: 60 x 32 bare copper. Nominal Lay length: 1.5". Insulation: .012” polypropylene. Shield: Braid Tinned copper - 96%. Capacitance between conductors: 19 pf/FT.

D. WIRE - INSTALLED SPEAKER LEVEL:

1. West Penn 227
   a. Contruction:
      1) Conductor Gauge: 2 - 12 AWG
      2) Strands: 19x25 bare copper

3) Insulation: .010” PVC
4) Jacket: 0.015” PVC
5) Shield: none.
6) Overall Diameter: 0.269” Nom.

b. Electrical:
1) Max Capacitance Between Conductors: 33.5 pf/ft Nom
2) DC Resistance per conductor: 1.7 Ohms/1000’

c. Mechanical
1) Minimum Bed Radius: 2.6” installed
2) Max Pull Tension: 152 lbs.

E. WIRE - LOW IMPEDANCE SPEAKER LEVEL:

1. Whirlwind W12GA
a. Conductor Gauge: 2 - 12 AWG
b. Strands: 65x30 bare copper.
c. Jacket: 0.33” PVC
d. Insulation: .027” PVC
e. Shield: none.

F. WIRELESS MICROPHONE ANTENNA CABLE: REFERENCED PRODUCT BELDEN 8240

1. Contruction:
a. Conductor Gauge: 20 AWG Solid
b. Insulation: .116” PE
c. Jacket: PVC
d. Shield: Tinned Copper Braid, 95” Coverage
e. Overall Diameter: 0.193” Nom.
2. Electrical:
a. Nominal Capacitance Between Conductor to Shield: 28.5 pf/ft
b. Conductor DC Resistance: 10 Ohms/1000’
c. Shield DCResistance: 4.1 Ohms/1000’
d. Nominal Impedance: 52 Ohms
3. Mechanical
a. Minimum Bed Radius: 2” installed
b. Max Pull Tension: 47 lbs.

G. WIRE - INSTALLED LINE LEVEL:

1. West Penn 293
a. Construction
1) Conductor Gauge: 22 AWG
2) Strands: 7 x 26 tinned copper.
3) Insulation: .008” Polypropylene
4) Number of Conductors: 2
5) Shield: Aluminum foil with 100% coverage
6) Drain Wire: Stranded tinned copper.
7) Jacket Material: PVC
8) Jacket Thickness: 0.017” Nom
9) Overall cable Diameter: 0.160” Nom
10) Flame Rating: UL 1666 Riser Flame Test
b. Electrical
1) Temperature Rating: -20 C° to +60 C°
2) Operating Voltage: 300V RMS
3) Max Capacitance between conductors @ 1kHz: 40 pf/ft.
4) Capacitance between Conductors to Shield @ 1kHz: 79 pF/ft
5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M’
c. Mechanical
1) Min Bend Radius: 1.6”

2) Max Pull Tension: 57.5 lbs.

H. WIRE - INSTALLED MULTIPAIR LINE LEVEL:

1. West Penn D440
   a. Construction
      1) Conductor Gauge: 18 AWG
      2) Strands: 7 x 26 tinned copper.
      3) Insulation: .006” Polyolefin
      4) Number of Conductors: 4 (2 Pair)
      5) Shield: Aluminum foil with 100% coverage
      6) Drain Wire: Stranded tinned copper.
      7) Jacket Material: PVC
      8) Jacket Thickness: 0.025” Nom
      9) Overall cable Diameter: 0.268” Nom
      10) Flame Rating: UL 1685 Riser Flame Test
   b. Electrical
      1) Temperature Rating: -20 C° to +60 C°
      2) Operating Voltage: 300V RMS
      3) Max Capacitance between conductors @ 1kHz: 42 pf/ft.
      4) Capacitance between Conductors to Shield @ 1kHz: 76 pF/ft
      5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M’
   c. Mechanical
      1) Min Bend Radius: 2.7”
      2) Max Pull Tension: 100 lbs.
2. West Penn D442
   a. Construction
      1) Conductor Gauge: 18 AWG
      2) Strands: 7 x 26 tinned copper.
      3) Insulation: .006” Polyolefin
      4) Number of Conductors: 8 (4 Pair)
      5) Shield: Aluminum foil with 100% coverage
      6) Drain Wire: Stranded tinned copper.
      7) Jacket Material: PVC
      8) Jacket Thickness: 0.025” Nom
      9) Overall cable Diameter: 0.268” Nom
      10) Flame Rating: UL 1685 Riser Flame Test
   b. Electrical
      1) Temperature Rating: -20 C° to +60 C°
      2) Operating Voltage: 300V RMS
      3) Max Capacitance between conductors @ 1kHz: 42 pf/ft.
      4) Capacitance between Conductors to Shield @ 1kHz: 76 pF/ft
      5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M’
   c. Mechanical
      1) Min Bend Radius: 2.7”
      2) Max Pull Tension: 100 lbs.

I. WIRE - INSTALLED MICROPHONE LEVEL:

1. West Penn 291
   a. Construction
      1) Conductor Gauge: 22 AWG
      2) Strands: 7 x 30 tinned copper.
      3) Insulation: .007” Polypropylene
      4) Number of Conductors: 2
      5) Shield: Aluminum foil with 100% coverage
      6) Drain Wire: Stranded tinned copper.
      7) Jacket Material: PVC
      8) Jacket Thickness: 0.017” Nom

9) Overall cable Diameter: 0.127” Nom
10) Flame Rating: UL 1666 Riser Flame Test

b. Electrical
1) Temperature Rating: -20 C° to +60 C°
2) Operating Voltage: 300V RMS
3) Max Capacitance between conductors @ 1kHz: 34 pf/ft.
4) Capacitance between Conductors to Shield @ 1kHz: 67 pF/ft
5) DC Resistance per Conductor @ 20° C: 17 Ω/1M’

c. Mechanical
1) Min Bend Radius: 1.3”
2) Max Pull Tension: 23.7 lbs.

2. West Penn 293
a. Construction
1) Conductor Gauge: 22 AWG
2) Strands: 7 x 26 tinned copper.
3) Insulation: .008” Polypropylene
4) Number of Conductors: 2
5) Shield: Aluminum foil with 100% coverage
6) Drain Wire: Stranded tinned copper.
7) Jacket Material: PVC
8) Jacket Thickness: 0.017” Nom
9) Overall cable Diameter: 0.160” Nom
10) Flame Rating: UL 1666 Riser Flame Test

b. Electrical
1) Temperature Rating: -20 C° to +60 C°
2) Operating Voltage: 300V RMS
3) Max Capacitance between conductors @ 1kHz: 40 pf/ft.
4) Capacitance between Conductors to Shield @ 1kHz: 79 pF/ft
5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M’

c. Mechanical
1) Min Bend Radius: 1.6”
2) Max Pull Tension: 57.5 lbs.

3. Microphone level wiring will be run as follows: WP 291 CL3 - 22 AWG (or equal as referenced above) is to be used for runs ≤ 100 feet. WP 293 CL3 - 18 AWG (or equal as referenced above) is to be used for runs in excess of 100 feet.

J. WIRE - INSTALLED MULTIPAIR MICROPHONE LEVEL:

1. West Penn D430
a. Construction
1) Conductor Gauge: 22 AWG.
2) Strands: 7 x 30 tinned copper.
3) Insulation: .006” Polyolefin
4) Number of Conductors: 4 (2 Pair)
5) Shield: Aluminum foil with 100% coverage
6) Drain Wire: Stranded tinned copper.
7) Jacket Material: PVC
8) Jacket Thickness: 0.025” Nom
9) Overall cable Diameter: 0.235” Nom
10) Flame Rating: UL 1685 Riser Flame Test

b. Electrical
1) Temperature Rating: -20 C° to +60 C°
2) Operating Voltage: 300V RMS
3) Max Capacitance between conductors @ 1kHz: 34 pf/ft.
4) Capacitance between Conductors to Shield @ 1kHz: 67 pF/ft
5) DC Resistance per Conductor @ 20° C: 17 Ω/1M’

c. Mechanical
1) Min Bend Radius: 2.4”

2) Max Pull Tension: 55 lbs.

2. West Penn D439
   a. Construction
      1) Conductor Gauge: 22 AWG.
      2) Strands: 7 x 30 tinned copper.
      3) Insulation: .006” Polyolefin
      4) Number of Conductors: 8 (4 Pair)
      5) Shield: Aluminum foil with 100% coverage
      6) Drain Wire: Stranded tinned copper.
      7) Jacket Material: PVC
      8) Jacket Thickness: 0.025” Nom
      9) Overall cable Diameter: 0.28” Nom
      10) Flame Rating: UL 1685 Riser Flame Test
   b. Electrical
      1) Temperature Rating: -20° C to +60° C
      2) Operating Voltage: 300V RMS
      3) Max Capacitance between conductors @ 1kHz: 34 pf/ft.
      4) Capacitance between Conductors to Shield @ 1kHz: 67 pF/ft
      5) DC Resistance per Conductor @ 20° C: 17 Ω/1M’
   c. Mechanical
      1) Min Bend Radius: 2.5”
      2) Max Pull Tension: 80 lbs.
3. West Penn D432
   a. Construction
      1) Conductor Gauge: 22 AWG.
      2) Strands: 7 x 30 tinned copper.
      3) Insulation: .006” Polyolefin
      4) Number of Conductors: 12 (6 Pair)
      5) Shield: Aluminum foil with 100% coverage
      6) Drain Wire: Stranded tinned copper.
      7) Jacket Material: PVC
      8) Jacket Thickness: 0.025” Nom
      9) Overall cable Diameter: 0.332” Nom
      10) Flame Rating: UL 1685 Riser Flame Test
   b. Electrical
      1) Temperature Rating: -20° C to +60° C
      2) Operating Voltage: 300V RMS
      3) Max Capacitance between conductors @ 1kHz: 34 pf/ft.
      4) Capacitance between Conductors to Shield @ 1kHz: 67 pF/ft
      5) DC Resistance per Conductor @ 20° C: 17 Ω/1M’
   c. Mechanical
      1) Min Bend Radius: 3.0”
      2) Max Pull Tension: 126 lbs.

K. MICROPHONE CABLE PORTABLE: REFERENCED PRODUCT PRO CO M SERIES WITH 223 B CABLE

1. Conductor Gauge: 23 AWG. Strands: 60 x 32 bare copper. Nominal Lay length: 1.5". Insulation: .012” polypropylene. Shield: Braid Tinned copper - 96%. Capacitance between conductors: 19 pf/FT.

L. WIRE – CAT5E NETWORK CABLE: REFERENCED PRODUCT WEST PENN 4245

1. Construction:
   a. Conductor Gauge: 24 AWG Solid
   b. Number of Conductors: 8 (4 Pair)
   c. Insulation: 0.008” Thermoplastic
   d. Shield: None
   e. Drain: None

f. Jacket Material: PVC
g. Overall Diameter: 0.202” Nom.

2. Electrical:
   a. Temperature Rating: -20° C to +60° C
   b. Operating Voltage: 300V RMS
   c. DC Resistance per Conductor @ 20° C: 9.38 Ω/100 m
   d. Mutual Capacitance: 14 pF/ft Nom
   e. Nominal Impedance: 100Ω +/- 15% (1-100 Mhz)
   f. Delay Skew: 45 ns/100m MAX
   g. Standards: TIA/EIA568-B.2
3. Mechanical
   a. Minimum Bed Radius: 4x Cable OD or 1” min.
   b. Max Pull Tension: 25 lbs.

PART 3 - EXECUTION

3.1 GENERAL:

A. Contractor will adhere to all requirements of the general contract for this project as called for in the project manual.

B. Assess life safety implications of all installation methods and verify there is no compromise of life safety issues. All liability for rigging, fastening, wiring, and other installation methods will be borne by the contractor alone. If the contractor has a reason to believe that safety will be compromised in the installation of any specified equipment in the locations specified they must note this at the time of bid and offer alternatives in writing.

C. Any dangerous work areas marked or roped off in a manner that will inform all persons as to potential danger regardless of sensory handicaps.

D. Maintain M.S.D.S. for all materials used where applicable and submit same if requested upon completion.

E. Maintain integrity of all fire walls and doors during construction and upon completion.

F. Take all precautions necessary to guard against electromagnetic and electrostatic hum, RF noise, supply adequate ventilation, and install all equipment for the maximum safety of the operator. Any of these conditions that affect system performance in any way will be rectified by the contractor at no additional cost.

G. The contractor will verify all on site dimensions prior to ordering or installation of critically dimensioned equipment and wiring. In a case of a discrepancy between these documents and attached drawings, construction documents, and actual on site dimensions the contractor will notify the owner and consultant before making any changes in intended work. The owner and consultant will determine the correct modification to the work to be done. No additional payments will be made for material or equipment improperly ordered or sized due to site variations.

H. Any equipment, hardware, wiring harnesses, or other items not specifically included in this specification but required for the system to function as called for within this specification will be the responsibility of the contractor at no additional cost to the owner.

I. Provide all racks, hardware, wire, conduit, raceways, and all other required parts to provide a complete system to the extent that such items are not provided by others. Provide rack shelves or kits for all equipment to be located in equipment racks that is not inherently rack mountable. Any shelf mounted equipment will be securely attached to the associated shelf.

J. All installation methods must be cosmetically acceptable to the owner. All equipment installed neatly, with respect to level, sight lines, and finish. All wiring must be neatly run and concealed in an orderly fashion and attached to appropriate support structures.

K. Moderate changes or moves necessary to accommodate other equipment, coordination with other trades, or for a pleasing appearance will be made without claim for additional payment.

L. Identify any equipment requiring licensing (wireless etc..) and initiate licensing procedures for all such equipment.

M. Coordinate all work with other on site trades in order to achieve a coordinated progress at all times.

N. Any existing equipment is the property of the owner and will be removed and delivered to the owner for salvage. This does not include debris, used conduit, wire etc.

3.2 WIRING AND RACKS:

A. The contractor shall field verify all locations where contractor provided wiring shall be run in order to determine each space's "plenum status." If any wiring noted on the drawings must be run through an air plenum space, then the contractor must provide plenum rated wiring for all such locations, even if the wiring noted on the drawings is non-plenum rated or spaces have ducted air. The contractor shall provide plenum rated wiring matching the specified wiring as closely as is possible. This applies to both EC provided wiring and other wiring to be installed by theatrical or A/V specialty prime contractors and subcontractors.

B. CONNECTORS (The priority for use of connectors is as follows):

1. Wherever barrier strips or Phoenix connectors are available to connect equipment these are the preferable means for connection. Barrier connections are to be made utilizing insulated crimp connectors. Phoenix connectors may be utilized without crimp connectors if proper strain relief is provided to avoid fatigue to the connection.
2. Next in order of preference are XLR type connectors. Where no other means is available balanced 1/4" are to be used. Unbalanced 1/4" and RCA are to be use only if no other means of connection is possible. Use right angle jacks where needed for space requirements. Banana jacks are not to be used on amplifier outputs.
3. All wiring (except AC power) entering or leaving the rack will be connected via terminal strips or direct connection to the equipment terminals or connectors. No in line connectors are acceptable. Appropriate connectors and controlled cycle crimping devices will be employed. No wire nuts may be used in any system wiring except AC power.

C. All wiring shall be neatly tie wrap bundled (or as indicated otherwise on contract drawings) with wires parallel and perpendicular to rack sides and backs and/or control booth walls or roll top desks (i.e. no random angle wiring). All wiring shall be dressed neatly from devices to input/output plates with excess cable hidden below the countertop and secured as described below.

D. All loose audio, control or power cables & wiring must be dressed neatly with tie wraps & eyes or ring runs & tucked up against underside of control booth countertop. No dangling and loose cabling shall be allowed underneath the audio control area. This means that the contractor shall not be allowed to simply coil up excess cable and lay it on the floor or hang it from the wall or over a junction box. All cabling shall be cut to length (unless specifically indicated to be of certain lengths on the drawings) and all excess to be securely mounted so that it cannot become caught, snagged or otherwise engaged by operators, legs, chairs, etc. All cabling not handled as described above shall be fixed by the contractor at no additional cost to the owner. No excessively long cables (except those called out by length on drawings) shall be allowed.

E. Provide a single 120 V AC 60 watt lamp or LED equivalent light source within each rack, located at the top of the rack as necessary to clear equipment mounted within the rack.

Provide rough duty lamps and protective lamp cages for each lamp, as well a switch assembly within each rack.

F. Provide all necessary jumper cables, turnarounds, adaptors, etc. as needed in order to interconnect all equipment as intended, even if those cables are not specifically shown on the drawings.

G. No equipment or terminal strips will be mounted to the sides, doors, top or bottom of the racks. Tie down bars will be provided by the contractor for neat wiring in adherence with industry standard practice.

H. Wiring Standards - Plenum Rated Cable: Unless specifically noted on the drawings, all low voltage wiring is to be CL2/CL3 wiring. Where specific plenum conduits exist its has been noted to use a plenum rated cable. Where wiring runs occur in concealed spaces – walls, ceilings, etc. - and are not enclosed in conduit the EC must verify the space is not being used as a plenum path. Any areas encountered that are plenums must have plenum cable or the wiring must be contained in conduit rated for the plenum application. Field verify conditions prior to ordering or installing cabling.

I. No rack rails will be allowed for equipment mounting in the rear of the rack unless otherwise noted in this specification.

J. Separate wiring paths must be maintained within each rack for microphone level, line level, AC, and speaker level signals. No bundling of dissimilar signal types is allowed.

K. No undue stress may be placed on any connection by a lack of support of the wiring within the rack.

L. Any equipment having accessible controls that are not normally used during system operation will have it's controls capped or otherwise locked such that they are not adjustable. If no other means is feasible the use of security covers is mandated. Rack doors are not acceptable as means of tamper resistance for controls.

M. Provide blank and/or vent panels as needed to complete each rack with no unfilled spaces, as per rack elevations or as required by alternates to equipment specified. No racks with unfilled panel spaces shall be allowed.

N. All conduits indicated on the drawings shall terminate directly into racks as shown – top, bottom or at any of the provided knockout locations (unless otherwise and specifically indicated on the drawings as otherwise) and so as not to obstruct access to the racks or adjacent walkways or approaches. Route conduits into racks with as few bends as possible – use sweep elbows where necessary. No loose or dangling or drooping wiring/cabling draped, dropped or festooned into the racks from dead-ended conduits or overhead cable tray systems shall be acceptable. All wiring shall be protected in conduit until it has reached the internal space of the indicated rack(s).

O. ELECTRICAL & GROUNDING:

1. All equipment to have the availability of chassis ground lifts or to be mounted with ground lift isolation washers.
2. Grounding of shields and chassis shall adhere to industry standard practice, with shields terminated at one end only on signal cables. Terminate the open shield end with plastic tape or shrink on collars.
3. All electronics' ground will be terminated to a single point within the rack. Ground this point as well as the racks to an appropriate main service ground provided by others. No AC line cord safety grounds may be lifted in an attempt to cure hum or noise problems. All such problems will be rectified by accepted industry practice such as the use of transformer isolation, ground lift rack washers, etc...
4. Any AC service shall be installed by the EC to standard Edison U-Ground style outlets at the locations noted on the electrical drawings. Where racks are located the service is to be run to the interior of the rack. This service should be capable of powering all system equipment at 100% of rated power. Two U-ground outlets

will be available for each 20 amp, single-phase circuit unless otherwise indicated or terminated into MPR style devices.

5. Internal rack AC distribution is the responsibility of the contractor. Acceptable methods: Rack mount power strips, rack mounted power distribution devices, Wiremold style outlet strip.
6. Install all internal AC rack power with all switches and controls carrying hazardous voltage housed in steel enclosures within the rack. Provide positive electrical grounding for all steel enclosures. All AC service will incorporate separate hot, neutral, and ground for each device. All grounds and neutrals will be appropriately bonded and connected to earth as required by codes and industry standard practice.
7. Provide each rack with sufficient AC isolated ground distribution for all equipment with 2 spares per rack.

P. CONDUITS:

1. Use separate conduits for microphone level (below -20dBm), video and line level (up to +30dBm) speaker level (greater than +30 dBm), control circuits and power circuits. No sharing of signal types within conduits is permissible.
2. All wiring in conduit shall be rated as necessary for full load continuous operation of the wiring within the conduit.
3. All conduits shall be concealed unless the owner has been notified in writing and accepts by written approval the location of the exposed conduits.
4. No conduit shall be allowed that is loaded beyond 50% fill. The contractor responsible for installing the indicated conduits shall upsize as needed any conduit found to be too small at no additional cost to the owner.
5. A pull string shall be left in place by the installing contractor after pulling all wiring through each conduit. This pull string shall be tied off at both ends and left for future use.
6. All lines, cabling or wiring in any conduit run must be free from any splices or junction points.
7. All lines, cabling or wiring must be free from damage. Any that exhibits stress, damage, intermittent signal problems, data errors or other anomalies due to excessive pull torque shall be replaced by the installing contractor at no additional cost to the owner.

Q. JUNCTION/GANG BOXES

1. Unless otherwise specified all controls, receptacles, user interface stations, plugs and outlets shall be located in an appropriately sized gang box. No multi-gang backboxes with raised, tile ring, extension ring or mud ring style reducers to obtain the specified faceplate gang size shall be acceptable in lieu of the indicated device backbox. Any multi-gang devices with these extension rings used shall be replaced and the specified backbox sizes provided by the EC at no additional cost to the owner.
2. Any junction (i.e. terminal blocks, punch down blocks etc.) shall be housed in metal enclosures with an attached ground. No such connections may be made in ceiling spaces or other areas without the use of a steel enclosure.
3. Any added junction boxes shall be sized and located for ease of troubleshooting access and all connections within shall be connected on terminal strips, which are clearly identified, in a logical, consistent & permanent manner.

R. ASSEMBLY & PRE-TEST

1. All equipment shall be turned on and burned in for a period of at least two weeks continuously before assembling into racks. No equipment may be delivered to the site without being fully tested and burned in off site. The equipment does not need to be under load during this period, although the contractor should shop test each piece of equipment for signal flow integrity.

2. All sub assemblies and individual components (i.e. speakers etc.) shall be fully tested off site before delivery for installation.
3. An inspection of the system in test mode is required. This inspection must take place before any equipment is installed on site. Allow two weeks notice prior to the date requested for the inspection.
4. Failure to provide the owner and consultant an in-test inspection of the equipment will result in 10% of the total contract price being held for a period of 6 months after system completion.

3.3 FINISHES & CLEANING:

A. All finishes shall be returned to their original finish and condition after any temporary machining or other work.

B. Cover any walls, furniture, finished floors and carpeted areas to catch all metal particles, grit, etc. that may occur during installation.

C. Cover all equipment left or installed on site during construction to prevent dust, dirt, paint or other airborne debris from infiltrating equipment and to prevent contamination or damage from occurring. The contractor shall be responsible for all cleaning and damage caused to any equipment being installed before the site is safe for such installation. Typically electronic equipment should not be installed until after drywall sanding, welding, painting, use of motorized man lifts, construction debris sweeping and other such work has been completed.

D. Any audio, projection or A/V equipment that has become dirty due to installation before room finishes are complete shall be completely cleaned by the contractor (both internally & externally) and returned to an “as new” condition prior to date of acceptance. This includes over spray from painting.

E. Provide thorough cleaning of all work areas including vacuuming, spray cleansers and dust removal as required. Clean all equipment fan filters before final acceptance tests.

F. If any paint-work is to be done on sight, all overspray or drips must be contained. The contractor is responsible for any damage to any building finish caused by their work.

G. Maintain clean work areas, removing all debris daily.

H. The contractor shall wipe clean (with a clean, damp cloth) all touchscreens, faceplates, misc. input/output jacks, audio racks, control console, rack mounted equipment, etc. just prior to turning the systems over to the owner. Upon cleaning, all items shall appear in as new condition and without scratches, blemishes, dirt, dust, debris, chalking, paint marks, etc. on them.

3.4 LABELING:

A. All switches, cables, wire, controls and outlets will be permanently and logically marked during installation. Permanently mark cables with an identifying label at each end, in a consistent logical manner. Submit to the consultant for approval a listing of intended nomenclature.

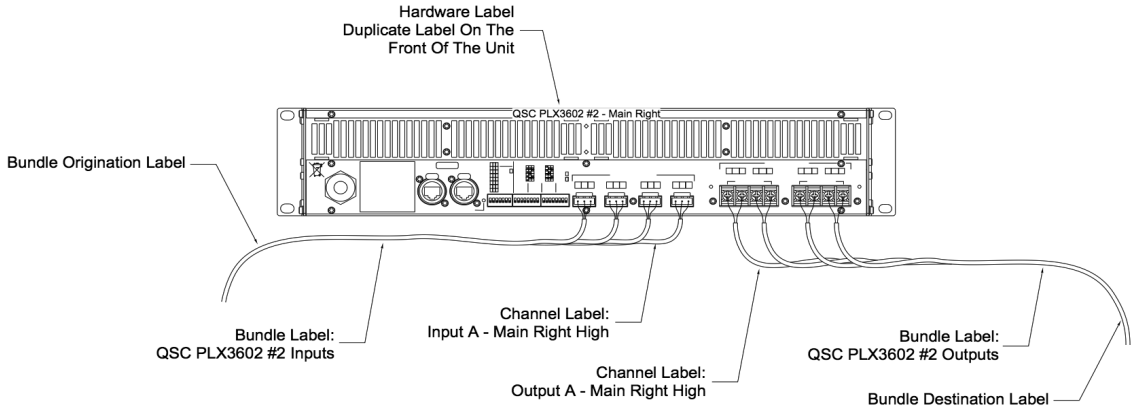
B. On metal panels and plates where possible engrave directly upon the plates and assemblies. Where disassembly of the equipment would be required to achieve engraving the use of adhesive or screw on engraved labels will suffice. Engravings will be paint filled for best contrast with black or white paint.

C. Do not use Dymo style labels or hand lettering. No cables will be labeled with masking tape, Gaffer tape, or other material subject to degradation. Such labeling may be done on a temporary basis during installation so long as all such labels are removed and their adhesive cleaned off when final labeling is applied. Self-laminating labels are preferable such as laser printed labels by Panduit.

D. Color-coding of the entire system will be logical and adhere to accepted industry standards.

E. Labeling must allow the owner and potential novice users to disconnect a piece of equipment or peripheral equipment and reconnect it without the need for drawings or assistance from the installing contractor. Labeling must be done in a manner that precludes errors in connecting. If multiple inputs of the same type (such as XLR, 1/4" etc....) are present in a location the labeling must be detailed.

1. All equipment shall be labeled on the back as to it's function and where multiple units are present the unit number.
2. All input wiring shall be bundled and all output wiring shall be bundled separately with the bundle labeled with the same nomenclature of the hardware. See example below:



3. Examples: Input 1 (XLR) plugged into an XYZ mixer should be labeled "INPUT 1 XYZ Mixer" if this mixer is located in a rack with other XLR input equipment. If this was a front of house mixer with only XLR inputs to the mixer then a snake labeling system of numbers only would be acceptable.
4. At the same mix positions, any 1/4" lines used for processing, sends, etc. would need to be labeled to match the nomenclature on the mixer and the associated line or piece of equipment due to multiple 1/4" jacks being present. A jack plugged into "AUX 1 OUT" should be labeled as such. If the other end plugs into "XYZ REVERB INPUT LEFT", it should be labeled as such.
5. Where network switches are being provided as part of the audio system, the contractor shall label all wiring destinations. Labels should describe network connection locations.
6. All punchdown block wiring shall be labeled on both the input and output. Input wiring shall be labeled with its origination and output wiring shall be labeled with its destination.

F. Labeling is subject to an extended warranty as noted in the "Warranty and Service" section within these specifications.

3.5 RIGGING:

A. The following minimum standards apply in addition to the standards referenced elsewhere in the specification. These guidelines do not negate the standards referenced elsewhere in the specification.

B. All equipment not described as portable in this specification will be rigidly held in place.

C. All equipment will be supported at a minimum of three points plus a backup. Each point must be able to carry the entire rated load with a safety margin of at least ten (10) times the rated load. All methods must incorporate an independent safety backup with a safety margin of at least ten (10) times the rated maximum load as installed in case of failure of any rigging component.

D. Speakers:

1. All speakers that are to be suspended must have factory installed and rated rigging points. No loudspeaker may be modified in any way by the contractor for installation by suspension. Speaker hanging hardware for the speaker must be furnished by the manufacturer or an approved rigging hardware manufacturer.
2. Speakers to be installed on brackets or mounts must utilize factory supplied components. No field fabricated brackets are acceptable unless authorized in writing before installation.
3. Where Omnimount brackets are used for mounting, the contractor should use the manufacture provided mounting points for the approved Omnimount. If a speaker model does not have the points where necessary, the contractor will need to drill the enclosure with the proper hole spacing. The contractor will need to internally span every 2 mounting points with 1/4” angle. No T-nuts will be accepted as mounting points.
4. For speakers utilizing flytrack to obtain the aiming angles, a duplicate set of double-stud fittings in the fly track with wire rope to structural supports is required. Wire rope to be properly dressed and tied off every 12” with nylon zip-ties with all excess cut off. Provide a safety cable from a manufacture provided hang point directly to structural steel.
5. Speakers installed with a Polar Focus Z-Beam or approved equivalent are to incorporate a safety cable from the speaker directly to main steel. All support from the Z-Beam to the speaker will be as indicated on the drawings.
6. Speaker audio cables are to be dressed along the nearest support cable. Audio cables are to have no tension and are not to alter in any way the aiming angle of the speaker. Speaker cables to be properly dressed along support cables.

E. All speakers that are suspended with overhead rigging are to be supported by 3 separate points plus a safety back-up cable. The safety back-up cable must be directly attached to structural steel. The safety cable is to have little or no slack.

F. All hardware used for rigging of speakers or other audio equipment to be installed with a torque wrench set to the manufacture settings.

G. All rigging and related fastening methods must be treated as permanent. All threads must be treated with vibration compounds such as vibratite or loctite as per manufacturer's recommendations.

H. All rigging hardware must be load rated with the load rating or approval stamped on each piece of hardware.

I. No chain of any type will be acceptable for the hanging or backup support of any equipment unless specifically called out on the drawings.

J. No fabric or plastic devices of any type will be considered as acceptable methods of hanging of any equipment.

K. No stainless steel rope may be secured with threaded compression type fittings alone (Crosby Clamps). Compression type closures such as Nicopress must be utilized. All wire rope is to have strain relief thimbles installed. All Nicopress crimps to use copper sleeves.

L. All loose ends of the wire rope will be neatly taped down after Nicopress is installed and crimped. No frayed rope ends will be allowed under this specification.

M. Where shackles are used in the rigging of speakers or other audio equipment, the shackles are to be moused with industry standard mousing wire. Mousing wire to be neatly trimmed.

N. All rigging work is to be done by a rigging contractor unless the sound contractor can supply documentation of their personnel having appropriate training in rigging.

O. All rigging tools such as nicopress crimping tools must have been calibrated within 6 months of the date of installation.

P. Contractor to have a go/no go Nicopress gauge on site for testing of crimps. Every 6th crimp should be tested. If a crimp tests no-go, all crimps between the last passing test and the failure to be tested. Any crimps that fail are to be replaced.

3.6 ROUGH-IN:

A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners representative for approval before proceeding.

B. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.

C. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location and mounting height of all equipment in finished areas, such as thermostats, fixtures, communication and electrical devices, including panels. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for Diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.

D. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. Obtain written authorization from the Owners representative or other contractor for any “rough ins” that, due to project schedule, are required before approved coordination drawings are available. Any work installed without written authorization or approved coordination drawings, causing a conflict will be relocated by the electrical contractor at no expense to the Owner.

E. For equipment and connections provided in this contract, prepare roughing drawings as follows:

1. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location.
2. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.

F. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.

G. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation.

3.7 CUTTING AND PATCHING:

A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction work on the architectural drawings. Refer to "General Conditions of the Contract for Construction" for additional requirements. Cut and drill from both sides of walls and/or floors (if possible) to eliminate splaying (if not possible, then contractor shall do everything possible in order to minimize splaying). Patch all cut or abandoned holes left by removals of equipment or devices. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering or other finished surfaces. Patch openings and damaged areas equal to existing surface finish (i.e. “patch to match existing”). Cut openings in prefabricated construction units in accordance with manufacturer's instructions. Contractor shall also refer to any “front end” contract document sections that deal with selective structure demolition, wall excavation procedures and cutting and patching for further details and instructions as it regards the cutting, patching and refinishing of any affected surfaces related to the rigging system removals and additions as well as the limits of incidental damage liability. If no instructions exist in the contract documents addressing these issues, then the contractor shall contact the architect and construction manager in writing prior to proceeding with any work in order to obtain written instructions regarding this type of work. Patching shall include infilling with new appropriate and matching materials in kind and finishing with standard industry practices. Patched and finished surfaces shall match those existing adjacent surfaces as closely as possible in finish, texture, color and durability. If the general conditions conflict with any of the language present in this paragraph, then the general conditions language shall take precedence as to methods for cutting and patching.

3.8 PROTECTION OF WORK:

A. All hanging mic boxes, recording mics, AFC mics, AFC speakers on battens over the stage area, stage choral or distant pickup mics attached to the rigging system, wireless access points, etc. and any other related equipment shall be completely wrapped with a heavy duty protective plastic covering taped securely in place around each device until all painting and other dust creating work within the auditorium and all related cleanups have been completed (unless these devices are installed after all above mentioned work and related cleanup has been completed). Any damage done to these items or any overpainting of connectors, control inputs/outputs, display screens, etc. shall be completely repaired by the contractor and all components returned to "as new" condition prior to energization of the system and at no extra cost to the owner. The contractor shall coordinate installation of the protective plastic coverings with the installation of devices and either wrap the units in such a way that they can be hung or installed with the protective plastic covering on them or wrapped after installation but before painting or other dust creating work has commenced. This may require the contractor to make multiple trips to the jobsite in order to accomplish this task. Upon completion of all room painting, dust creating work and related cleanups the contractor shall remove all parts of the protective plastic covering, tape, etc. And shall legally dispose of the protective coverings, tape, etc. All items related to the installation and removal of the protective plastic covering shall be performed and completed at no additional cost to the owner. Any tape residue shall be cleaned from affected devices as well.

3.9 CONCEALMENT:

A. Conceal all contract work above ceilings and in walls, below slabs and elsewhere throughout building (this does not include control consoles, input stations, user interface devices, touchscreens, etc.). If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review and written authorization and instructions on how to proceed. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance. Obtain and maintain written records and approvals for all work exposed work performed or devices installed.

3.10 PERFORMANCE:

A. PROCESSOR SET UP: Unless otherwise instructed within the following is the basic configuration for all processor systems:

1. Speaker Equalization: All speaker specific equalization to accomplish room preference curves, control speaker anomalies, provide high pass, low pass, or bandpass capabilities shall be accomplished on output filter banks. Limiters shall be applied to prevent system overload. Set the out put limiter to a threshold of 0 dB attack 10 MS and release of .5 seconds for main speakers and delayed speakers. Set limiters for monitor speakers as required by the application and gain structure of the system.
2. ADA system feeds - All ADA systems shall be fed with compression and auto level providing consistent gain of 0 dB +/-3dB.
3. Delay shall be applied where required to:
    a. Provide signal delay for delayed loudspeakers and ADA equipment.
    b. Provide signal delay to compensate for cluster packing frequency anomalies.
    c. Provide signal delay to integrate monitor system bleed with the main speaker systems.
    d. Provide feedback correction in monitor systems.
    e. Provide frequency shading and beam steering of low frequency systems.
4. Program inputs shall operate with no filters applied unless a preference curve is called for by the owner. All program inputs will include a compressor set to a threshold of 3dB below nominal operating level of the equipment connected. Set controls for soft knee compression, ratio of 6:1, attack time 30 Ms and release of .33 seconds unless conditions require different settings.
5. Program inputs shall incorporate gates set to eliminate background hiss of the equipment when program is not present. Set threshold and characteristics for a gradual fade out when program drops off. Low level program material must not allow gates to activate.
6. Line level inputs from manual mixers shall have similar settings applied as is utilized with program inputs except with regard to compression. Limiting for system safety shall be utilized instead of gain control style compression. Set the threshold to 6 dB below system clipping with hard knee characteristics and minimum 10:1 ratio.
7. Microphone inputs shall be set for automated functions in groups based on use. NOM attenuation shall be 3dB. Priorities will be assigned as required by use.
8. Compression shall be applied to all microphones inputs to prevent system overload. Soft knee characteristics shall be utilized. Gain structure as required by the system application for the specific microphone.
9. Auto level shall be applied to microphone inputs with the intent of providing gain riding within a 20 dB range of the target level. If feedback conditions are encountered in set up do not change NOM settings, Adjust the auto level to compensate.
10. Fade times for presets shall be set to 5 seconds unless requested otherwise by the owner or consultant.
11. All matrix settings for gain shall be adjusted to conditions and placement of microphones and speakers for specific presets.
12. Test the system with microphone applications as described within the functional descriptions of the presets. Tune all presets for optimum signal to noise and natural reproduction.
13. Final equalization will be done during acceptance testing with a variety of signal sources.

B. DIGITAL CONSOLE SETUP

1. Channel Setup

a. Channel Gain Structure – contractor shall program the gain structure for each mic type provided. Gain structure shall be set so that the fader has full range to unity.
b. Channel EQ – Contractor shall program the channel EQ for each provided mic type. EQ shall be contoured for typical uses of the mic type.
c. Channel Dynamics – Contractor shall program each mic type and line input type with compression and gating. Gating thresholds shall be set for -55 dB. Compressors shall be set with soft knee compression, ratio of 5:1, attack time 30 ms and release of .33 seconds.
d. Channel Routing – Contractor shall program channel routings to each monitor bus as well as main left right outputs.

2. Monitor Setup
   a. Contractor shall program each output with a 1/3 octave graphic eq's and set delay as required. Set all stage monitor busses to post fader.
3. Main Left/Right Setup
   a. Contractor shall program each output with a 1/3 octave graphic eq.

C. SOUND SYSTEM PROCESSOR PRESETS:

1. Preset 1 - Automated – Wireless mic, AM Podium, and MIP inputs active with all others muted. All processor outputs active. Volume controls for automix inputs available on the portable fader remote.
2. Preset 2 - Manual Configuration - Console main left/right, Console Subwoofer, and monitor inputs on the processor active with all others muted. All outputs on the processor active.

D. TEST EQUIPMENT: (All test equipment will remain the property of the contractor.)

1. AC Voltmeter with frequency response within +/- 1dB from 20Hz to 20KHz from .0001 V to 240 V.
2. Sine Wave generator continuously variable from 20Hz to 20KHz +/- 1 dB with less than .5% THD at 1 V into 600 ohms.
3. Loudspeaker phase checker.
4. CD player with library of program material and direct box.
5. Digital Multimeter - May be included with AC voltmeter.
6. SMAART, TEF or other DUAL FFT Analyzer with calibrated microphones.
7. Oscilloscope with at least 250 MHz bandwidth.
8. Impedance measuring device capable of measuring on at least 4 octaves from 125Hz to 2000Hz from 0 to 1000 ohms.
9. All cables, adaptors, etc. required for test procedures enumerated.
10. Two walkie-talkies.
11. Laptop PC loaded with all DSP control software loaded. A cable of at least 100' to interface to the DSP's must be onsite during acceptance tests.

3.11 INITIAL POST COMPLETION TESTS & SET UP:

A. Parasitic oscillation and RF pickup: Verify that the system is free from RF pickup and oscillation with no input as well as normal operating levels.

B. Loudspeaker phasing: Check each loudspeaker with a phase measuring device for proper polarity.

C. Proceed to equalize all systems to conform to the specified initial performance criteria.

D. Uniformity: Measure each system to verify adherence to the performance specification frequency response. Measure at least 12 points including extremities within the seating area at 4 KHz for coverage uniformity. Correct any problems.

E. Distortion, rattles, and buzzes: With high quality digital program material set the equalized systems for average levels of 90 dB check for unusual distortions or rattles. Also apply a constant sine wave sweep from 80 Hz - 8000 Hz at a level providing average levels of 86

dB measured at standing ear height. Walk through all systems and check for unusual distortions or rattles. Correct any problems. If the problem is outside of the system, bring the source to the attention of the owner.

F. Gain Control Settings: Adjust controls for optimum signal to noise of the all systems relative to the performance requirements of this specification. Adjust all inputs, equalizers, limiters, etc. to provide equal relative loudness of music and voice sources with typical input levels. Adjust all equalizers, delays, etc. for use as called for within the specification.

G. After initial tests have been made, proceed to equalize the system for feedback control as per normal practice.

H. Verify all systems inputs, outputs, equipment and functions.

3.12 DOCUMENTATION:

A. Contractor must submit (7) seven copies of the following items. All items should be part of the O&M Manual.

B. Wiring diagrams showing all wiring types, connections, and paths. Any terminal block locations must be clearly marked on blueprints. Full as built drawings of installed wiring showing all nomenclature and color codes.

C. System testing documentation as required by final testing and acceptance procedures outlined in this document.

D. ALL O&M Manual submissions shall be in heavy-duty, D-Ring style, 3-Ring binders (provide size most appropriate for the quantity of paperwork included) with front plastic display pocket and internal side pockets. NO PAPER FOLDERS SHALL BE ALLOWED.

E. Complete technical manuals for all equipment installed.

F. List of serial numbers of all equipment installed, and the specific location of each piece of equipment.

G. Warranty cards for all equipment.

H. Manufacturer MSDS sheets for all applicable equipment.

I. Operations & Maintenance Manuals shall NOT include any alternate languages or language sections unless specifically requested by the owner (i.e. French, Dutch, German, Spanish, Japanese, etc.). If alternate language manuals are requested by the owner, then the contractor shall provide all alternate language manuals as complete manuals in that language in addition to the required English manuals. Any alternate language manuals required shall be at additional cost to the owner.

J. Operations & Maintenance Manual: An operations and maintenance manual (or “Systems Manual”) written in English on the safe use of a that particular site’s audio and A/V system(s) shall be provided by the contractor to the owner (provide separate manual sections for different spaces included in this project – each to be a separate, complete and distinct section in the manual for each differing or multiple system and location). The manual shall be a custom compiled manual detailing the specific equipment & conditions included in this project and at this job site (and not including misc. parts & pieces that are not part of this job). No general, cookie-cutter style manuals detailing equipment not specified or provided for this project shall be acceptable as part of this requirement. This manual should include, but is not limited to, the following (these items shall also be included in the system training and video taping):

1. Table of contents
2. Simplified operational instructions written by the contractor. This should include information covering all normal operating modes of the system as designed. Where the technical manuals suffice, copies of operational sections may be inserted as detailed information.
3. Maintenance procedures required for equipment installed.

4. Simplified troubleshooting guide for typical and common problems associated with the control console, automix system, Crestron system and related LCD stations and any other systems furnished as part of this project.
5. A complete section for the Crestron control system LCD screens showing a screen shot of each screen, overall system topology, detailed explanations of button functionality for each page, preset link control and a step-by-step procedural guide to follow in order to reset the system or reinstall the control configuration if problems arise.
6. All troubleshooting guides should be set up in a standard, simplified, 2-column format (problem description or error code, steps to take for resolution) and should employ straightforward descriptions in standard English without abbreviations, slang or other non-standard vernacular.
7. System turn on/off procedures.
8. Software reset procedures.
9. Override Procedures in case of control failures.
10. Operation of control consoles including standard procedures, all patching, functions and file saves.
11. How to patch/repatch channels on the console, channel copy/paste, channel attributes, user defined button programming, how to set, record, operate, edit and recall presets and parameters, cues, etc.
12. An overview of saving files, creating system and file backups, recalling and restoring backups or saved files, software and firmware update procedures, etc.
13. Lists of any special tools or requirements to perform maintenance.
14. Lists of consumable items and replacement parts for routine maintenance. (fuses, etc.) and recommended stock levels for such parts.
15. Graphic documentation of contractor adjusted control settings.
16. Video of patch configuration screens for each critical screen on the system (these can also be done as digital stills with a quality still camera or as screen captures).
17. A “show” operation overview – i.e. how an operator would set up a show and program parameters.
18. Emergency contact number(s) and procedures to follow in the event of a catastrophic system failure.
19. As built line diagrams. Mount one copy of the applicable finished system line diagram behind clear plastic near the associated equipment racks.
20. Maintenance procedures and recommended schedules required for equipment installed.

K. Provide a copy of the software presets to consultant and owner. Provide a copy of the operating software to owner.

L. The contractor shall provide a copy of the compiled touchpanel file for each touchscreen as well as the uncompiled code for the entire control system. The contractor shall provide copies of all control software required for all AV control hardware.

M. A DVD (or set of DVD’s, depending on requirements listed below) that details the training of users on the owner’s installed systems. See owner instruction section below.

N. O&M Manual pdf requirements: The contractor shall provide a pdf copy (with appropriate titles) for each piece of documentation listed above and bound together in a pdf portfolio/binder, labeled with the owner’s name and with the submitting contractor’s information. All electronic manuals shall contain only equipment and information that pertains to the project. Where custom procedural guides and troubleshooting manuals are required, these shall be produced by the contractor in a professional piece of software (Microsoft Office, Adobe Acrobat or cadd software or equal) and shall contain all required information in a neat and logical presentation. Where there are portions of the stock manuals that contain sections that do not pertain, the contractor shall use a program such as Adobe Acrobat Pro, BlueBeam or other similar pdf markup software applications and use the strikethrough function with a heavy red line to strike out any text or sections that do not apply. Where factory manuals are available the contractor shall provide these.

Where factory manuals are not available, the contractor shall provide high resolution (150 dpi minimum and fully optimized in Acrobat or equal), full page, properly and consistently oriented pages in a consecutive ascending order. All pdf portfolio and binders produced and submitted shall be professionally put together and presented well. No pdf scan pages that are skewed, illegible, mis-ordered, angled, copied at a low dpi setting or that do not pertain to this project shall be allowed. All manuals shall be saved as standard Adobe Portable Document Format (PDF) files that are capable of being opened & viewed on any modern computer system with a standard pdf reader and shall be without password access protection or other security preventative measures engaged.

3.13 OWNER INSTRUCTION:

A. All owner instruction to be provided by the contractor as part of this contract shall be scheduled and performed within 12 months of the final system turnover date to the owner (that date, determined by the architect and/or construction manager, that is on or around the completion and fulfillment date of all the contractor's installation obligations and final punch list completions). Any training that has not been requested by the owner prior to this 12-month time frame will be considered forfeiture, and the contractor shall not be obligated to perform it or to provide a monetary give-back due to training not performed. Additional training beyond the 12-month time frame shall be performed at the contractor's discretion at additional cost to the owner.

B. Training time may be utilized in any number of ways that may not relate directly to the hands-on training. These required hours can be utilized in order for the contractor to perform additional system programming, set manipulation, customizing layouts, control screen optimizations/changes or any other related work requested by the owner – up to the "not to exceed" hour totals listed in these specifications. Additional training or programming work beyond that indicated in these specifications shall be at additional cost to the owner.

C. The contractor will provide a training program at the project location (owner's location) and with the project equipment (owner's equipment), consisting of the following hours/periods of instruction (TOTAL TRAINING TIME NOT TO EXCEED 30 HOURS. NO TRAINING BLOCK TO BE LESS THAN 4 HOURS IN DURATION. ALL TRAINING HOURS ARE EXCLUSIVE OF TRAVEL TIME.):

1. INITIAL SYSTEM TRAINING: This block of time is to consist of at least four (4) hours of instruction, which should include such topics as basic system setup, patching topology, software system navigation, EQ usage, general system maintenance, console functions & programming, detailed console operation, console preset/library creation and storage, trouble-shooting procedures, transferring channel attributes, recording presets, touchscreen navigation and control and establishing a general familiarity and working knowledge of overall system setup and operation with the owner and owner's designated operators. The contractor shall also cover the following topics specifically related to the digital mixing console: Gain Structure, EQ and associated library functions, Patching, Saving & recalling presets, Channel copy/paste, Access of Aux, EFX, and Rev functions as well as assignment and programming the EFX rack. The areas described above are not the only areas of training required but are specific items to highlight during the training process.
2. REHEARSAL TRAINING FOR SPECIFIC EVENTS: This block of time is to consist of at least four (4) hours of instruction, which should include such topics as procedures to follow in creating a show, detailed steps in how to create show-specific presets and person-specific EQ settings, proper microphone usage and multi-microphone setups, microphone placement, proper equalizing of various microphone types (those included in the job), etc. with the owner and owner's designated operators.
3. FIRST PERFORMANCE TRAINING & ON-SITE ASSISTANCE: This block of time is to consist of at least four (4) hours of on-site assistance. This will require the

contractor to be on-site (at the owner's facility) and in attendance at the first event with the new audio system. The contractor will act as a hands-on assistant and technical advisor for any system problems/difficulties that may arise during the first event. The contractor is not to act as the audio console operator or "grunt" for this event, but is to act as an expert advisor and field technician to address any system problems or assist with technical difficulties that may arise. The contractor is to be in attendance and at the audio console operator's general position for the duration of the first event in the owner's facility with the new audio system.

4. FOLLOW-UP TRAINING: This block of time is to consist of at least four (4) hours of follow-up training, which should include a more in-depth understanding of and training in the operation of previously mentioned topics. This training is also to be set up to answer problems encountered during events, general system understanding questions and other items that will assist the owner and owner's designated operators in using and maintaining the new audio system.

D. Training hours shall be set up on a spreadsheet by the contractor with each block of training time signed off on by the appropriate owner or construction manager personnel. Training time hours shall commence once the contractor has arrived on site (at the pre-arranged time) and shall conclude when the contractor prepares to leave after training has finished for that session. Training times that have not been properly signed off on by the appropriate personnel may be required of the contractor again.

E. Training intents are for all system training to be as hands-on for the end users as is possible and NOT to be lecture style with the instructor touching all of the controls. The end users should be operating the specific devices being described as the instructor is teaching in an "over-the-shoulder" style so that they are getting a real feel for programming system parameters, operating controls & interfacing with other system devices, etc. A simple demonstration or explanation of procedures is not acceptable. The owner's personnel must actually perform the procedures themselves, with the contractor, trainer and his men providing backup and support the entire time.

F. Training will be scheduled at the convenience of the owner and may take place on more than one day. The owner is not obligated to receive all hours of training on one day or all hours of training included for this project.

G. Additional software training for owner of eight (8) hours [in addition to training time mentioned above] in making adjustments to basic settings in presets (including, but not limited to, Crestron system, video projector software and adjustments, wireless mic management software, etc.). This is not to include designing configurations. A short-cut manual will be written by the contractor as to how changes are made and then turned over to the owner during training. Manual is for future reference by the owner and the system operators.

H. All training for audio and A/V related work detailed within this specification shall be performed by individuals designated by the contractor who possess actual field experience, detailed knowledge of and expertise on the system(s) and specific equipment being demonstrated. All training techs should also possess good people skills and be adept at accurately and effectively communicating with a group of end users of various skill levels. All training shall be provided by individuals in the employ of an authorized dealer or by a factory representative. All training shall be performed by the same individual in order to provide continuity & familiarity for the owner. No training from multiple rotating individuals at each different training session shall be allowed. No training techs without detailed system knowledge shall be allowed to demonstrate equipment to the owner or to train end users. If the contractor does not possess adequate or trained personnel who are qualified to provide training, then the contractor shall arrange for (at his own expense) a third-party qualified trainer for all training sessions.

I. Video Taping - The contractor is responsible for video taping of the training on the system. The contractor will provide a camera (mini DV minimum requirement) and operator to video tape "primary system training". Primary system training will consist of an operational

walkthrough of each system with general operations, all equipment and power source locations at the owner's facility, etc. Specific operational instruction shall be provided on owner equipment or on identical equipment at the contractor's shop – set up in a similar fashion to owner's equipment. Provide (1) copy of the DVD training set for acceptance by the consultant and (2) copies of the DVD training set to the owner (after written acceptance by the consultant). The contractor should also keep (1) copy of the DVD training set for his own records and in case the owner needs future copies. The video training DVD set needs to include all items listed in the "Documentation" section "Operations & Maintenance Manual" section that pertain to this project at a minimum.

J. The video training shall be edited and transferred by the contractor onto DVD's of no longer than 4 hours each in length. This includes any additional trainings required on software, preset creation, network gear manipulation and addressing, etc. Editing should remove user questions unless they are applicable to a full understanding of the system. Video training should include short cut, quick setup type topics as well. A program such as I DVD should be used to create an opening screen directory, titled indexing chapters, etc. in order for the DVD to provide appropriate search features. No hour long, single chapter sessions shall be acceptable. Chapters should be limited to approx. 5-minute lengths and should be arranged in a logical order. There must be an intro screen, which shows the chapters of the DVD with titles. No pictorial only chapter designations shall be allowed. All chapters must be titled. Video to be in 16:9 HD format in a well lit room. All DVD's shall be presented to the owner in DVD cases with a cover/jacket for each that indicates the content and author of the DVD training series. Single DVD training sets shall be provided in 7 mm premium slim single disc polypropylene style DVD cases. Multiple DVD training sets shall be provided in 27 mm premium multiple disc polypropylene DVD cases. No paper DVD sleeves shall be acceptable. Derogatory comments about the consultant should be edited onto a separate disc and delivered to the consultant with names of the persons making each comment.

K. The intent of the video taping and training is for the finished DVD product to be a complete and intensive professional video reference guide to operational system components for future use and not simply a visual record of the training sessions. Since this DVD training shall be utilized by various other users in the future (novice users and previously trained users needing a refresher), it shall be filmed in such a way as to make it informative and valuable for all system users and shot in an "over-the-shoulder" style. This will require the contractor to provide adequate personnel during training (system trainer(s) as well as qualified camera operator(s), camera, tripod, supplemental lighting and other required accessories). Provide a tripod with enough height adjustment and articulation capabilities that can be positioned in such a way as to obtain mid and close-up control surface, control screen, fader/button operation, system device and operator interface shots during training sessions. No static, group, distant shot or dark, unfocused, grainy, jerky and unclear training DVD's shall be acceptable. Provide additional video shoot lighting as needed in order to obtain necessary light levels for professional video footage to be shot. No DVD's shall be acceptable that have video where the operator's body blocks the screen or large portions of it during the training. All video footage must be steady and professional. The intent is not for the camera to be focused on the trainer but on the system devices being demonstrated and with the devices being trained upon clearly shown on the screen and readable. Large portions or the majority of the video training DVD's should be product/device specific (i.e. the training video should be of the systems at this facility or identical to the systems at this facility).

3.14 WARRANTY AND SERVICE:

A. The contractor guarantees all equipment, materials, and workmanship to be free from defects for a period of one year from the date of owner acceptance. This warranty supersedes all manufacturers warranties for the one year period. Any manufacturer's warranty that exceeds the one year will continue to be applicable. The contractor will

replace any defective materials at no charge to owner. Any equipment replaced during the one year warranty will have a new one year warranty to the owner.

B. The contractor guarantees all labeling to be free from defects for a period of two years from the date of owner acceptance. In cases where the label's adhesive fails or the label suffers from degradation causing it to become unreadable, the label will be considered defective and will be replaced at no cost to the owner.

C. The contractor will respond by phone to requests for service within 2 business hours, and respond with a technician being sent (if needed) within 1 business day.

D. Any equipment that tends to "drift" or whose performance deteriorates during the warranty period will be considered defective, even if such drifting is normal during break in. This equipment will be readjusted at no charge to the owner.

E. Provide during the warranty period two service inspections for preventive maintenance, at six month intervals. This will include but not be limited to cleaning fan filters, checking speaker operation, lubricating controls as needed, checking microphones for proper operation, and a full system operational check.

F. Provide all service at the owners location regardless of any manufacturer warranty terms regarding carry in service.

G. During the warranty period if any equipment failed will take more than 24 hours to repair, the contractor will make available and interconnect at no cost to the owner suitable temporary equipment to maintain a fully operational system until repairs are complete.

3.15 SIGNAGE:

A. A sign shall be posted in an accessible location (typically on the rack(s) or in the control booth) providing the name, address and phone number of the primary system contractor, manufacturer and supplier (if not already listed) of the system equipment.

3.16 DEMONSTRATION AND ACCEPTANCE:

A. CONDITIONS FOR SCHEDULING FINAL ACCEPTANCE:

1. It is not the intention of the final acceptance to be a "punch list" meeting. The system is required to be complete and fully tested. Any failure that may have occurred between the contractor's final tests and the date of acceptance will be noted and can be corrected after that date. All of the following conditions must be met before scheduling an acceptance tests:
   a. All system ground loops and other problems resolved. (The consultant will ramp all amplifiers to full gain and all inputs to full gain to test for ground loops. Residual electronic noise will be acceptable, ground loop noise will not be acceptable.)
   b. All gain structuring complete and settings marked.
   c. All wiring and labeling complete. No "Clean up" to be done on date of tests.
   d. All inputs tested and operational.
   e. All speakers operational and phase checked.
   f. Any equipment failures resolved. All equipment to have been burned in as noted within the specifications.
   g. All microphones and peripheral equipment including portable equipment tested.
   h. The contractor will submit an initial post completion test report to the architect, construction manager, owner, and consultant. In this report, the contractor will certify that they have completed all of the initial post completion tests.
   i. The contractor will submit documentation as required to the consultant.

B. PROCEDURE FOR SCHEDULING FINAL ACCEPTANCE:

1. The contractor shall notify the owner and consultant of a proposed date and time for the final acceptance tests. The contractor shall include two alternate dates and times. The dates proposed will be a minimum of fourteen (14) calendar days from the date of the proposal.
2. The owner and consultant will respond within two (2) business days as to whether the date and time for final acceptance tests has been approved.
3. If none of the dates and times are acceptable, the owner and/or consultant will submit two alternate dates and/or times to the contractor. The contractor will respond within two (2) business days as to whether the dates and times for acceptance tests are acceptable.
4. If the dates and/or times proposed by the owner and/or consultant are not accepted, the contractor, owner, and/or consultant will continue to alternate per these procedures until an acceptable date and time has been found.

C. DATE OF TESTS:

1. Test equipment as enumerated above must be set up and operational. A technician familiar with the equipment must be on hand.
2. Tools must be on hand to remove connector plates and provide for other possible inspections.
3. All racks must be open and all security covers removed.
4. Documentation for all wiring must be completed in at least a neat draft form and on site. This must include as built nomenclature and wiring schedules.
5. The control software must be programmed and all equalization completed for the presets and scenarios as indicated.
6. The control laptop computer must be located in the middle of the seating area for the room to be tested. The technician who performed the programming must be on hand for the testing and acceptance.
7. Any time required to resolve any of the above conditions will be billed by the consultant at the rate of $ 100.00 per hour to be deducted from the contractor's remaining balances with the owner. Any time waiting for the contractor to set up test equipment or locate microphones or other required equipment will be billed at the same rate and in the same manner.
8. Any return trips to correct any of the above conditions will be wholly billed to the contractor and deducted from the contractor's remaining balances with the owner at the same rate.
9. Changes to the tuning accommodate subjective assessments will be done during acceptance. These adjustments will incur no costs to the contractor.

D. CONDITIONS OF ACCEPTANCE:

1. It is understood that the consultant cannot inspect every aspect of the installation. The contractor is responsible for installation quality and methods, fabrication quality and methods, and performance of their work. Acceptance of the project will constitute an acceptance of the following:
   a. All specified equipment is installed and the system is operating in an acceptable manner from a functional standpoint.
2. Upon completion and acceptance of the project the contractor will provide to the owner a letter stating that all of the equipment and installation methods meet or exceed the specification requirements in all respects, and that the system as installed meets all of the applicable standards and codes required under the specification and meets applicable federal, state, and local codes and laws.
3. Final adjustments for the sound system presets will likely need to be changed in the days following completion. This will require the participation of the contractor at several events over as much as forty-five (45) days after system acceptance. These adjustments will be made at no additional charge and upon reasonable notice by the owner. These visits will not exceed a total of sixteen (16) manhours on site (including any travel time).

4. Prior to acceptance testing there are a number of conditions that need to be verified. There are also site conditions required for the consultant to perform tests as indicated. The contractor shall ensure that every item on this checklist has been performed and verified prior to the consultant's acceptance tests can begin. Scheduling of the consultant to perform final acceptance tests must be coordinated with the owner, the project's construction manager (or clerk of the works), the contractor and the consultant (See paragraphs above for detailed requirements).
5. GENERAL:
    a. No other contractors may be working within the rooms to be tested during tests. Adjacent rooms cannot have construction noise – drilling, jackhammer usage, hammering, pounding, banging, etc. The consultant will be testing room conditions, coverage, functionality, turning on/off lighting, etc., and this requires an environment with no noise being produced by others and no people moving about.
    b. No rehearsals or other activities may take place during tests.
    c. The contractor must verify these conditions can be maintained during testing. If acceptance tests are scheduled and conflicts on site are found, the contractor scheduling the tests will be responsible for paying the costs of a return visit (see billing rates noted above).

E. AUDIO – TYPICALLY TAKES 4-8 HOURS:

1. Required Attendance – Personnel from the sound contractor equipped with test equipment as required within specifications. All test equipment set up and ready for use.
2. All room finishes complete. The sound systems may not be tested until carpeting, chairs, acoustical panels, stage curtains, etc. are all installed.
3. System Status:
    a. All labeling complete
    b. Front of equipment faces
    c. Rear of equipment panels
    d. Cabling & cable dress
    e. Plates installed with all trim rings present
    f. Snakes and output cabling
4. All security covers removed, but on site ready for reinstallation after tests.
5. All systems must be fully wired and gain structured – free from buzzes, hum and noise.
6. The system must be equalized as required within specifications. Additional tuning will be done during acceptance, but primary equalization should be done prior to acceptance.
7. All microphone inputs and line level outputs tested for continuity and operation.
8. All intercoms tested on all circuits and able to be verified.
9. Hearing assistance system tested and ready to be verified.
10. Recording systems set up and calibrated for expected gain.
11. All wireless systems must be coordinated for frequencies with no interference in the locality they are installed. Units should not unsquelch or exhibit any noise issues even if all transmitters are not in use.
12. All wireless must be walk tested for dropouts and set up for drop out free performance and frequency coordinated.
13. Automixer must be set up and operational with appropriate gain structure for each input type. All aux sends routed and gain structured for monitor feeds and ADA.
14. All auxiliary gear and record systems tested.
15. HVAC system operational and able to be controlled if needed.
16. Interface at the booth location to all DSP and digital consoles with software and laptop must be set up and operating. A programmer from the sound contractor must be on site fully versed in all DSP and console operations and programming. Adjusting the system from the rack or backstage is not acceptable. Speakers shall be grouped by function in the processor for ease of changes.

17. Speakers shall all be wired properly, in phase and aimed and steered as per the contract documents.
18. Processors must be programmed with all factory parameters for each loudspeaker type. This includes stage monitors.
19. Each speaker and each section of biamp/triamp speakers needs to be able to be fully controlled during testing, as well as all processor setting. If this requires additional personnel at the amp racks with walkie-talkies or cell phones these persons need to be available.
20. Audio control console must be set up with the proper cards installed and all addressing, programming and patching fully complete.
21. The ADA system must be fully functioning with levels set, source selection and a quality signal present at each receiver and throughout the room.
22. All green room feeds shall be present, tested and without hums, buzzes, ground bars, etc.
23. Verification in the form of signed documents that all portable equipment has been delivered to the owner per specs and drawings. Portable equipment must be available for visual inspection as well.

F. VIDEO & PROJECTION SYSTEMS – TYPICALLY TAKES 1-2 HOURS:

1. Projectors properly adjusted for contrast, color and resolution input by input.
2. Control system programmed to allow all operational modes.
3. Source material set up for viewing:
   a. DVD – HDMI or analog as required by design.
   b. Demo DVD for viewing if system is DVD equipped.
   c. Excel spreadsheet
   d. Test patterns – Grayscale – SMPTE Bars, Luma Ramp.
   e. HDMI test generator if the system is HDMI compatible.
4. Any other specific software such as Final Cut Pro, etc. must be configured with appropriate surround sound assignments.

G. CONTROL SYSTEMS – TYPICALLY TAKES 1-2 HOURS:

1. All control system equipment installed and fully functioning.
2. All control system software programming complete.
3. All touchscreen controls fully programmed and functional (i.e. all buttons, pages, commands, etc. must work and execute intended tasks).
4. All touchscreens must mirror each other and all pages update to both screens as to current selection status, etc.
5.

END OF SECTION

SECTION 19 20 00
THEATRICAL LIGHTING & RELAY SYSTEMS

PART 1 GENERAL

1.01 PROJECT INFORMATION:

A. Owner: Homer Central School District

2021 Homer Capital Improvements Project
Intermediate/Junior High School
58 Clinton Street
Homer, NY 13077

B. Hunt Engineers, Architects & Land Surveyors P.C.

Airport Corporate Park
100 Hunt Center
Horseheads, New York 14845

C. Consultant: AVL Designs, Incorporated

1788 Penfield Rd, Suite 1
Penfield, New York 14526
Phone (585) 586-1100

D. Contractor: The successful bidder for the work described herein. Also referred to as the Theatrical Contractor (TC), the bidder, the lighting installer or the lighting contractor.

E. Others: Various companies doing construction work under the general contract.

1.02 PROFESSIONAL STANDARDS:

A. The contractor is expected to install all work to the appropriate industry professional standards, manufacturer recommendations, and current applicable codes. If any work required exceeds the skills of the contractor, they will employ appropriate subcontractors for the scope required.

B. The acceptability of materials and workmanship will be determined by the Architect, Consultant, and CM.

C. Any work that might be damaged, be inadvertently painted, or become dirty during construction will be protected by the contractor. All responsibility for protection shall be by the contractor. The contractor will provide final cleaning and or repair of all equipment in their scope to like new condition.

D. The contractor will attend and/or arrange meetings as required to make sure their scope is coordinated with all other trades. The contractor is responsible to make known to all other trades critically dimensioned items and locations to avoid conflicts. Where conflicts occur follow required procedures in the project manual to seek resolution.

E. Where any substandard work is provided by related trades that impedes the work of the contractor, they will notify the CM, Consultant, Architect, or Engineer in writing as called for one the project manila to rectify the issue.

F. Where work is provided by others the contractor is responsible to verify installation conditions that relate to their work. If installation of related work is substandard the contractor shall generate a written RFI through proper channels based upon the project manual. The contractor shall not install their work to any substandard devices, etc. provided by others until such work has been resolved or until the contractor has received

written authorization from the construction manager to proceed. If the contractor ignores substandard installation work by others and proceeds to install his devices to these items, then he accepts and bears sole responsibility to repair, reinstall and correct any found deficiencies to the satisfaction of the owner upon final inspections.

G. The contractor will comply with the AHJ (Authority Having Jurisdiction) as it relates to programming any and all emergency interfaces.

H. The contractor is expected to possess knowledge of the equipment of their industry and to provide all small items required to install the specified equipment. Provide small items such as rack rails, DIN rails, rack panels, power cords, connectors, wall-wart power supplies, crimps, Nicopress and other items that may not be called out on drawings or in specs but are required to support primary equipment.

I. When in doubt about any aspect of the work the contractor should not proceed until they obtain clarification from the appropriate entity following procedures detailed in the project manual.

1.03 DEFINITIONS:

Code Requirements	Minimum requirements as specified by all applicable and published codes.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Devices	Any piece of gear, equipment, indicated component and any misc. related items required to implement and install a fully functioning system.
Equal or Equivalent	Equally acceptable as determined by Owner’s Representative.
Extend	To increase the length(s) of any indicated conduit/wiring, etc. so as to reach a particular specified or implied point – including the provision of any misc. additional equipment as required for proper extension and to maintain full system functionality.
Final Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnish	Supply and deliver to installation location to the appropriate trade responsible for installation.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative

Install	Mount and connect equipment and associated items and make ready for use.
Labeled	Refers to classification by a standards agency.
Or Approved Equal	Approved equal or equivalent as determined by Owner's Representative.
Owner's Representative	The Prime Professional, Construction Management or Clerk of the Works.
Patching	Repair of holes, marks, and damage left from removals. Consult project manual for requirements.
Provide	Furnish, install and connect ready for use.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Remove	Safely Disconnect including any and all wiring, hardware, conduit (except concealed), anchors, suspension hardware etc. Legally dispose of items not called out to be offered to or returned to owner.
Review	A general contractual conformance check of specified products.
Satisfactory	As specified in contract documents.
Shall	Indicates that the contractor must perform work and provide devices as indicated. This is a mandatory, obligatory, contractual requirement and is not optional in any way.

Refer to General Conditions of the Contract for additional definitions.

1.04 INTENT OF DRAWINGS:

A. Throughout the contract documents there are various manufacturers and products referenced. It is understood that these products establish a basis of design that all other "or equal" substitutions must meet or exceed. All submitted devices must be the referenced product or approved equal.

B. The drawings in this package are diagrammatic in nature, unless detailed dimensioned drawings are included. The drawings show the approximate locations of equipment and devices. The final and exact locations of all non-dimensioned devices are subject to the approval of the Owner or the Owner's Representative. Devices with detailed installation dimensions; however, are critically located and must be installed to those indicated dimensions unless alternate instructions have been given to the contractor in writing by the consultant.

C. The contractor(s) shall inspect the entire building(s) with the Owner’s representative prior to beginning any work and shall identify the exact locations and installation methods for all devices, conduit and wiring prior to beginning work.

D. Typical details are shown for the installation of various devices. The details do not apply to all situations. Installation methods for all work shall be subject to the Owner’s and construction manager’s approval. Provide all work and equipment required for a professional, workman-like installation.

1.05 SECTION INCLUDES BUT IS NOT LIMITED TO:

A. Removals – May include storage and reinstallation of some items.

B. Provision of Theatrical lighting system and related work scope as indicated on drawings including controls for lighting fixtures.

C. Furnishing some equipment for install by others.

D. Wiring, setup, focus and commissioning.

E. Training and closeout documents (some training on equipment provided by the owner).

1.06 RELATED SECTIONS & DOCUMENTS:

A. The contractor(s) shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification. The contractor will be responsible for cooperation with and adherence to the overall scope and intent of the project relative to the work being done by the contractor.

B. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 0, 1 and 26 specification sections apply to work of this section (related specification sections may vary depending upon the particular CSI format being adhered to). All related drawings, contract conditions and general requirements found in the project manual that apply to the general contract will apply to the work described in this specification. Examine all referenced documents for general project requirements relating to the work in this specification. Contact the architects, engineers and/or construction manager for any clarification required to properly bid this project. It is the contractor’s responsibility to obtain necessary clarification before bidding. No change orders will be allowed for existing project conditions and contractor requirements not properly investigated by the contractor.

1.07 RELATED WORK NOT INCLUDED:

A. Electrical Removals Work: The electrical contractor shall be removing extensive portions of the existing dimming and architectural control systems, wiring, feeders, racks, etc. The TC will need to coordinate with the EC as it relates to these systems and any items that could potentially be reused.

B. Electrical: The electrical service for the lighting system will be provided by the EC/electrical contractor. The specialties contractor (TC) will need to coordinate his work with the availability of electrical service. The electrical requirements are detailed and extensive and are as noted on the contract drawings.

C. Electrical: The EC shall be providing fairly extensive removals work as part of the lighting systems removals. The electrical removal requirements are detailed on the contract drawings.

D. Houselighting LED Retrofit Kits: These fixtures/retrofit kits and related conduit & wiring shall be provided by the EC/electrical contractor. The theatrical contractor will need to coordinate his work with these fixtures & lamps and incorporate his controls into the lighting system as indicated.

1.08 GENERAL REQUIREMENTS:

A. Removals - Offer all existing portable and removed equipment to the owner prior to legally disposing of these items. Obtain written permission from the owner for all existing removed items that they do not desire to retain prior to disposal.

B. Provide all equipment outlined and described within this specification and assemble it into a complete, properly functioning system for use by the owner as described within this specification.

C. It is the contractor's responsibility to clarify any misunderstandings or drawing-to-drawing/drawing-to-spec discrepancies prior to bid. In cases of a difference between stated quantities in drawings, specs or electrical drawings, the higher quantity will prevail.

D. Check each component before installation as well as each portion of the project during installation to ensure that the intent of this specification is achieved.

1.09 BIDDER QUALIFICATIONS – SUBMITTALS:

A. The bidder shall provide references of at least three (3) installations of comparable scope performed by the bidder, including location, system description, and name, address, and telephone number of the architects, consultants, and owners and the names of contract persons for each.

B. The bidder must maintain service facilities and have service available on site within 24 hours. The bidder must be a factory authorized dealer for all products submitted and may be required to submit such proof of factory authorization in writing, or in the form of copies of authorized agreements with the various vendors.

C. The bidder and all persons performing theatrical lighting system related work on this project must be certified (those performing low voltage terminations, system commissioning, programing, fixture focus/hang, DMX/RDM/Network addressing and other related areas). This will require the installer to either be a current ETCP (Entertainment Technician Certification Program) certified entertainment electrician or an equivalent factory trained and certified installer (from the equipment supplier) or a crew working under the direct supervision of a certified foreman (of either certification described above). This applies to all theatrical lighting equipment installation and any other assemblies indicated as being provided or installed by the contractor. Proof of current certification MUST be provided in the submittals package (this is typically in the form of a pdf copy of the current and active certification certificates from PLASA). Out of date or expired certifications shall not be recognized as meeting the requirements of ETCP certification.

1.10 INQUIRIES AND COMMUNICATIONS:

A. All questions should be posed in writing as called for in the project manual.

B. Direct communications to the consultant via phone are recommended for initial discussion about intent or site issues. (unless prohibited in the project manual). No action may be taken based on verbal communications, they must be followed up in writing as called for in the project manual.

C. Where discrepancies occur, and pre-bid instructions have not been obtained by written request, the contractor will abide by the owner's decision at no additional cost to the owner.

1.11 COORDINATION:

A. Cooperate with other trades to achieve well-coordinated progress at all times. Notify the owner and consultant as often as necessary with regards to job progress or changes in the installation schedule. No change orders for additional payment will be allowed based upon conflicts with other trades on the project site. All such conflicts will be reported to the architect, construction manager, owner, and consultant in writing. All reasonable attempts will be made to correct any difficulties.

B. Staff the job site adequately at all times to maintain a progress in keeping with the total project progress. No allowances will be made for overtime required to maintain job progress.

C. Provide all materials to be installed by others in a timely fashion based upon the related trades' schedules.

D. The job site will be left in a clean safe condition at the end of any workday. All cleanup and debris removal to a site designated by the owner will be the responsibility of the bidder on a daily basis.

E. All storage of tools and materials will be done by the contractor. No on-site storage security will be provided by the owner.

F. The contractor will attend regular meetings with the architect, owner, general contractor, and the consultant when requested by any of the above, in order to achieve project coordination and progress.

G. The contractor shall be required to share all approved lighting system shop drawings with the EC prior to rough-in. He shall work closely with the electrician in determining final control wiring types, quantities and requirements, related device locations, backbox sizes, conduit routings, etc. before the EC has purchased his supplies and in order to meet the construction schedule.

1.12 DELIVERIES:

A. It is each contractor's responsibility to receive all device shipments, equipment, deliveries, etc. for their own equipment on/at the job site personally. Each contractor shall be responsible to arrange for storage of all received materials on site until the appropriate time when they shall either turn them over to installing contractor or install them.

B. If the contractor chooses to allow a third party to receive shipments on his behalf the contractor bears sole responsibility for any missing and/or damaged parts.

C. Any equipment that is furnished by the contractor for installation by others shall be turned over to the installing contractor at a time that fits into their production schedule and the project's overall construction schedule.

1.13 STANDARDS REFERENCES:

A. The contractor is responsible for the provision of material and methods installation of equipment conforming to the currently applicable standards of:

1. ADA - Americans with Disabilities Act
2. AISC - American Institute of Steel Construction
3. AISI - American Iron and Steel Institute
4. ANSI - American National Standards Institute
5. ASME - American Society of Mechanical Engineers
6. ASTM - American Society for Testing Materials
7. AWS - American Welding Society

8. EIA - Electronic Industries Association
9. ESTA - Entertainment Services and Technology Association
10. FCC - Federal Communications Commission
11. IEC - International Electronics Commission
12. IEEE - Institute of Electrical and Electronics Engineers
13. IFI - Industrial Fasteners Institute
14. ISO - International Organization for Standardization
15. NACM - National Association of Chain Manufacturers
16. NEC - The National Electric Code
17. NEMA - National Electrical Manufacturers Association
18. NFPA - National Fire Protection Association
19. OSHA - Occupational Safety and Health Association
20. SAE - Society of Automotive Engineers
21. SMPTE - Society of Motion Picture and Television Engineers
22. TIA - Telecommunications Industry Association
23. UL - Underwriters Laboratories (Electrical components, devices and accessories shall bear a UL label where applicable. UL listed and labeled as defined by NFPA70, article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.)
24. USITT - United States Institute for Theater Technology "Recommended Guidelines for stage rigging and stage machinery-specifications and practices".

B. Provide certification and labels where applicable. Comply with federal, state and local regulations and applicable union regulations where required. Provide all equipment with proper labels for sale and use within New York State.

C. Provide only equipment that is standard, new equipment, the latest model of regular stock product and is supplied with all parts regularly used with the equipment offered for the purpose intended. The contractor guarantees that no modification of the equipment has been made contrary to the manufacturer's regular practice.

D. Review all materials and equipment prior to installation and notify owner as to any changes or discrepancies between published specifications and the actual material and equipment to be installed, including discontinued product updates, etc.

E. It is understood throughout this document that any referenced standards are intended to refer to the most current version of said standard (even if an older version of the standard is referenced).

1.14 EQUIVALENTS:

A. The successful bidder shall submit any product equivalents prior to award of the contract. When requested, the successful bidder shall also submit information, describing in specific detail, how the equivalent bid material differs from the appearance, quality and performance required by the base specification. Submittal of the manufacturer's advertising cut sheets alone is not acceptable for proof of equivalency.

B. Proof of equivalency may require the bidder to provide physical samples, a full-sized mockup or specific manufacturer information detailing technical equivalency. Proof of equivalency shall be the burden of the submitting contractor/bidder and not that of the consultant. Proof of equivalency relates to all pertinent functions of the specified equipment, regardless of if that information is reflected on any manufacturer’s issued cut sheets.

C. If proposing equivalents that affect the system design as shown on the drawings, the bidder must submit flow charts, and any other drawings necessary to show differences in the system operation from the primary referenced system.

D. The bidder will pay for any and all changes to related work scope required by the equivalent products.

1. This includes electrical, architectural, structural and other changes that might be needed to implement an equivalent product.
    a. Some products with virtual identical functions have varying power requirements, physical dimensions, etc.

E. The risk of whether bid equivalents will be accepted is borne by the contractor. See section 2.1 “Performance Requirements” for more information.

F. No equivalents will be considered after the Contract award unless specifically provided in the Contract Documents.

G. Final judgment as to equality will be solely that of the consultant, architect, construction manager and owner.

H. Equivalents must meet or exceed the specified product’s performance characteristics. No product shall be considered equivalent to the specified product if it has lesser performance characteristics in any critical area.

I. The costs for any changes by other trades required to implement the equivalents proposed will be borne by the contractor.

1.15 SUBMITTALS:

A. Equipment: After bid award but before ordering any equipment or starting any work submit to the owner for approval a list of all equipment to be furnished showing types, models, quantities and manufacturer. Attach catalog sheets for all items submitted.

B. The quantity and form (paper and/or electronic copies) of all submittal material required shall be provided by the contractor to the appropriate parties as is indicated in the contract front end documents (in addition to any requirements listed below). If there are no indications in the contract front-end documents, then the contractor shall submit (1) electronic copy of each area, category, etc. of items as listed below. All submissions are understood to be intended for approval by the construction manager, the architect, owner, general contractor and the consultant prior to any fabrication or installation of any devices.

C. Submit a schedule for submission of drawings for fabrication and site work.

D. Submit a complete submission package with all required paperwork.

E. Submit each of the following as each pertains to this project. Provide a copy for each related person performing indicated work who holds these certifications:
1. Current training certifications.
2. Current ETCP certification.
3. Current manufacturer certifications.

F. Submit material schedules and shop drawings for approval by the architect, consultant and owner prior to any fabrication or installation as follows:
1. The full set of submitted drawings and data sheets must be presented in a professional manner.
2. All drawings for submission must be CADD drawn (created with a computer aided drafting program). Hand drawings are not allowed. Illegible drawings shall not be acceptable.

3. All cut sheets for submission must be high-resolution electronic (pdf) copies of the manufacturer's actual data sheets. Mark up each sheet with highlights or boxes around submitted products, options, etc. No data sheets shall be acceptable that are illegible, poorly photocopied or hand marked up with scribbles, etc.
4. Drawings of proposed mounting methods for all equipment.
5. Samples of proposed marking systems for wire and equipment labeling.
6. Rack layouts, panel layouts and proposed labeling.
7. Schedule for submission of drawings for fabrication and site work.
8. PE stamped shop drawings for the intended rigging supports for all fixtures being suspended in non-standard ways (i.e. fixtures being suspended from Unistrut channels, angle iron, box steel, misc. metal, etc. and that are not mounted into drop/hard ceilings or from typical pendant style mounts).

G. Quality Assurance
1. The Basis of design for the dimming, relay and control systems equipment as well as most of the theatrical fixtures shall be manufactured by Electronic Theater Controls, Inc., 3030 Laura Lane, Middleton, Wisconsin. The equipment is described in complete technical data available from the manufacturer.
2. Fabrication shall begin only after approved drawings and a written notice to proceed have been delivered to the manufacturer at the manufacturer's place of business.
3. A qualified engineering representative employed by the manufacturer shall visit the job site after installation is complete and prior to the energization of the system to inspect, test and adjust the system.
4. This representative shall terminate & connect all control wiring, verify all load and line wiring, and energize the system. The factory representative will also program architectural control presets.

1.16 GENERAL SYSTEM DESCRIPTION:

A. Theatrical Lighting System:
1. Architectural Lighting Controls
2. Performance Lighting consoles (may be furnished by owner)
3. Relay panels
4. Integrally dimmed LED lighting (may be furnished by owner)
5. Emergency Lighting Interfaces (Existing to remain)
6. Hang and focus of luminaires (may be provided by owner)
7. Integration of houselighting into overall system architecture
8. Commissioning, Training and closeout documentation

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS:

A. The requirements of the referenced equipment are not generic in nature. Specific performance, control and routing capabilities are necessary for any alternate or substituted equipment. The details set forth herein and within the functional descriptions of each system are the critical criteria for the selection of each piece of equipment.

B. In bidding equipment from manufacturers other than those referenced be aware that all functional information included in this specification as well as the manufacturer's specifications, physical size, serviceability, acoustic output, warranty terms, product availability and other non-technical issues may be determining factors in product equivalency. Final judgment as to equality will be solely that of the owner, architect and consultant.

C. If the contractor substitutes a piece of equipment that does not meet with all of the critical device functionality of the specified equipment (functionality and feature set as detailed below, inherent in the specified equipment, available as provided option and/or required based upon the intents of the contract documents), then he will have to replace all substandard equipment or substituted equipment that does not meet, match or exceed the specified equipment with either the specified equipment or an alternate piece(s) of equipment that meets/exceeds the specified equipment's feature set and shall provide all reprogramming, installation, conduit, wire, etc. as is required.

D. All lighting must meet these minimum requirements:
   1. Minimum Foot Candle Requirements: See Section S804 of the New York State Education Department's Manual of Planning Standards – 2014 Draft. Reference Table S804-1.
   2. All luminaires must meet or exceed the minimum initial NEMA LE5 Target Efficacy Rating (TER). See Section S804 of the New York State Education Department's Manual of Planning Standards – 2014 Draft. Reference Tables S804-2 & S804-3.
   3. All LED fixtures shall feature power factor correction (PFC) in their circuitry and/or meet a minimum power factor (PF) of .9. Active PFC is preferred, although passive PFC is acceptable, if the fixtures meet the minimum PF.

E. Equivalents Criteria:
   1. Relay rack substitutions require proof that the substituted product meets all performance requirements including but not limited to:
      a. Product warranty period
      b. Physical rack size
      c. Relay density
      d. dB noise output of rack
      e. Rack noise frequency response curve
      f. 0-10 Volt control capabilities
      g. DMX routing and control capabilities
      h. Relay rack's acoustic output and tonality
      i. No field modifying the rack itself by the contractor in order to meet spec.
      j. No operational capabilities limitations in order to meet spec.
   2. DMX/0-10V Data Emergency Bypass device substitutions require proof that the substituted product meets all performance requirements including but not limited to:
      a. Physical device size
      b. Device installation options (rack mount, DIN rail mount, etc.)
      c. Physical quantity of inputs, outputs, sourcing & sinking
      d. Physical quantity of emergency, UL924, contact, panic or other inputs
      e. Output modes (DMX, 0-10V, 0-15V, 0-2.5V, 0-5V, etc.)
      f. Current rating per channel
      g. Snapshot ability of a DMX "look" into the device's non-volatile memory
      h. Signal isolation and fault protection limits
      i. Quantity of DMX universe control
      j. Protocol conversion and compatibility with alternate control schemes (sACN, DMX, RDM, 0-10V, DALI, etc.)
      k. DIP switches, programming buttons & configuration limitations
      l. Panic controls interface
      m. UL924 controls interface
      n. UL924 capabilities
      o. No operational capabilities limitations in order to meet spec.
      p. Required (or not required) device backbox quantities & sizes
      q. Emergency control system topology
      r. Device quantity, lack of need for additional power/control conduits, wiring, etc.

s. LED indicator light for device emergency status, etc.
t. Form factor
u. No required, additional or “buried” accessories or devices in order to obtain system performance requirements.

3. Lighting control console substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Product warranty period and advanced replacements policies
   b. Physical console size
   c. Console fader wing attachment locations and options as well as how these devices interconnect with the console and the monitor mounts, clearances in low-profile rolltop units, ability to configure as the specified system, etc.
   d. Quantity of individual faders
   e. Moving light knobs/wheels
   f. Remote focus unit device interface without the need for remote or multiple wireless access points, etc.
   g. Ability to output to an external monitor
   h. Quantity and type of physical external monitor outputs
   i. Ability to interface with touch screen monitors
   j. Control channel count capacity
   k. DMX universe count control capacity
   l. Built in touch screen control
   m. Drag and drop features on console touchscreen
4. Architectural control system substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Product warranty period
   b. Physical device size
   c. Required device backbox sizes
   d. Architectural control system topology
   e. Preset recall by button stations and LCD displays.
   f. LCD display size, color & programming options
   g. LED indicator light on individual control station devices
   h. Form factor
   i. No required, additional or “buried” accessories or devices in order to obtain system performance requirements.
   j. No spare wire requirements
   k. Ability for each pushbutton station button to trigger the unique preset desired and not simply manufacturer determined or hardware/software restrictive preset order recalls.
   l. Ability for architectural control system to read console snapshots and recall them via presets.
   m. No “room” restrictions in system topology or functionality.
   n. Proximity detector on LCD stations
   o. For all 0-10V, DMX, network or RDM devices the equipment provided must meet or exceed all programmatic, voltage options, etc. of the specified equipment.
5. Lighting fixture substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Product warranty period and advanced replacements policies
   b. Physical fixture size
   c. Form factor
   d. Light output pattern
   e. Light output intensity in FC distribution
   f. Wattage of lamps
   g. Expected and average lamp life

h. Ability of fixtures to fit/hang in intended locations and with all physical limitations of surrounding structure.
i. Ability of theatrical fixtures to side-hang on tormentor or Shakespeare pipe assemblies.
j. Ability of theatrical style fixtures to be oriented “base up” for houselighting applications.

6. LED fixture substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Product warranty period and advanced replacements policies
   b. Physical LED strip size, flexibility & durability
   c. PF (power factor)
   d. Light output pattern
   e. Efficacy (lumens per watt)
   f. CRI
   g. PWM frequency adjustability (to high rates)
   h. Light output intensity in FC distribution
   i. Form factor (physical size, weight, etc.)
   j. Wattage of LED’s
   k. Expected and average LED & related drive electronics lifespan
   l. Total length of runs powered by a single, dimmable LED driver/power supply shall meet or exceed specified products.
   m. LED driver/power supply(ies) and their ability to dim the LED’s smoothly and down to 1% is critical.
   n. Ability of LED fixtures/strips to fit in intended locations and with all physical limitations of surrounding structure.
   o. Binning tolerances & LED quality control must match or exceed specified product.
   p. LED drivers, interfaces, mounting options, etc. shall meet or exceed specified product.
   q. No rope lighting or similar products (not even LED rope lighting) shall be considered as an equal to the specified LED strip lighting products nor shall any rope lighting equivalents be approved.
   r. Lumen outputs at deep colors
   s. Visual representation of white light output of fixture - color temperature variants
   t. Power draw requirements.
   u. Beam spread characteristics
   v. Fixture power supplies must have inherent brown-out protection built in, such as a switching power supply, that shall be self-resettable, not fuse driven and shall not require human interaction in order to operate.
   w. Color mixing capabilities without excessive rainbowing effects at beam edges
   x. Fixture lens options
   y. Total numbering and visual quality of distinct renderable colors
   z. Critical accessories and mounting options.
   aa. Fixture cooling methodologies – convection cooled, fan cooled, overall fan noise in dB, tonality of fan noise and any frequency spectrum spikes in the overall response curve, etc.
   bb. Programmatic usage of the space as well as the specific room acoustic character, overall HVAC noise and tonality, etc. will also have an effect on any particular fixture’s suitability for use in a space and are evaluated on a case-by-case basis.

7. LED houselighting retrofit kit/fixture substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Product warranty period and advanced replacements policies

b. Physical LED strip size, flexibility & durability
c. PF (power factor)
d. Available light output patterns
e. Lumen package options
f. Efficacy (lumens per watt)
g. CRI
h. PWM frequency adjustability (to high rates)
i. Light output intensity in FC distribution
j. Form factor
k. Wattage of LED's
l. Expected and average LED & related drive electronics lifespan
m. LED driver/power supply(ies) and their ability to dim the LED's smoothly and down to <1% is critical (dim to black capabilities). Some general house/work lighting fixtures need only dim down to approx. 10%, based upon specified manufacturer's product.
n. Ability of LED fixtures/strips to fit in intended locations and with all physical limitations of surrounding structure.
o. Binning tolerances & LED quality control must match or exceed specified product.
p. LED drivers, interfaces, mounting options, etc. shall meet or exceed specified product.
q. No rope lighting or similar products (not even LED rope lighting) shall be considered as an equal to the specified LED strip lighting products nor shall any rope lighting equivalents be approved.
r. Visual representation of white light output of fixture - color temperature variants.
s. Absence of visual anomalies during static and/or dimmed states (i.e. no flickering, ghosting, jitters, popcorning, etc.)
t. Overall acoustic output of fixture during static and/or dimmed states (i.e. fixtures must not create any discernable acoustic output or tonality of acoustic output while in use)
u. Absence of RF interference during use/standby state
v. Power draw requirements.
w. Beam spread characteristics
x. Critical accessories and mounting options.
y. Fixture cooling methodologies – convection cooled, fan cooled, overall fan noise in dB, tonality of fan noise and any frequency spectrum spikes in the overall response curve, etc.
z. Fixture installation requirements (installable from below, retrofittable into existing ceiling and holes, etc.)
aa. Programmatic usage of the space as well as the specific room acoustic character, overall HVAC noise and tonality, etc. will also have an effect on any particular fixture's suitability for use in a space and are evaluated on a case-by-case basis.

8. Wire substitutions require proof that the substituted product meets all performance requirements including but not limited to:
   a. Jacket Type
   b. Number of Conductors
   c. Jacket Shape – i.e. round, twisted, etc.
   d. Number of strands and gauge
   e. Flexibility
   f. Overall physical size of wire
   g. Capacitance and resistance conductor-to-conductor as well as single conductor.

F. No contractor-manufactured products shall be acceptable in place of referenced items except for those items enumerated in this specification as "custom."

G. The current manufacturer's data sheet, user's manual and actual technical specifications/capabilities/feature set for each referenced piece of equipment in force at the date of printing of this specification shall be the basis for the specifications of the referenced equipment.

H. Any necessary product accessories such as additional duplex power outlets, power supplies, rack mount kits, connectors, adapters or other small items are the responsibility of the contractor to provide, whether or not they are called out in detail within these specifications. This may include additional electrical work, depending upon the differences between substituted and specified equipment and shall be the sole responsibility of the contractor to provide at no additional cost to the owner.

I. Specification details are provided only for the features required for current and intended future uses of the products.

J. Quantities:
1. Where no quantity is indicated in the written specifications, the contractor shall supply quantities as indicated on drawings.
2. Items not indicated on drawings but necessary for project completion shall be provided as required for project execution at no additional cost.

2.02 ARCHITECTURAL CONTROL SYSTEM RACK ENCLOSURE: REFERENCED PRODUCT ETC UNISON ERN SERIES CONTROL ENCLOSURES

A. Control Enclosures
1. The control Enclosure shall be the Unison ERn Series Control Enclosure as manufactured by Electronic Theatre Controls, Inc., or equal.

B. Mechanical
1. The ERn Control Enclosure shall be a surface mounted panel constructed of 18 gauge formed steel panels with a hinged, lockable full-height door containing an integral electrostatic air filter.
a. The Enclosure door shall have an opening to allow limited access to the control module face panel.
b. Enclosures shall be convection cooled without the use of fans.
2. Control Enclosures shall be sized to accept one or two Control Processors and one or two Station Power Modules, including various options and accessories.
a. The two-space Control Enclosure (ERn2) shall support a single Station Power Supply module
b. The four-space Control Enclosure (ERn4) shall support two Control Processors, and two Station Power Supply modules, or, one Control Processor, one Station Power Supply Module and one Station Bus Repeaters module, or one control processor and one dual Station Bus Dual Repeater module.
3. All Enclosure components shall be properly treated and finished.
a. Exterior surfaces shall be finished in fine textured, scratch resistant, powder-based epoxy paint.
4. Enclosure(s) shall also be available in a 19" rack mounted (RM) version.
a. Rack-mounted version shall have an independent Enclosure suspension kit, with a full height, locking door/cover attached to the kit.
b. Rack-mounted version shall have an opening to access the control module face panel, and openings to view indicators on option modules.
5. Enclosure dimensions and weights (without modules) shall not exceed:
a. ERn2 - 15" W x 9" H, 10" D, 15 lb.
b. ERn2-RM - 19" W 11"H 10" D, 20 lb.
c. ERn4 - 15" W x 14" H x 10" D, 20 lb.

d. ERn4-RM - 19" W x 16" H x 10" D, 25 lb.

6. Top, bottom, and side knockouts shall facilitate conduit entry.
7. Enclosures shall be designed to allow easy insertion and removal of all control and option modules without the use of tools.
   a. Supports shall be provided for precise alignment of modules into power and signal connector blocks.
   b. With modules removed, Enclosures shall provide clear front access to all power and control wire terminations.
8. Option Modules
   a. Ethernet Switch (ENET - Surface Mount ERn only)
      1) The Control Enclosure shall support an optional 5-port Ethernet Switch, with at least 4 ports supplying Power over Ethernet (PoE).
      2) The Ethernet Switch module shall be 10/100BaseTX, auto MDI/MDIX, 802.3af PSE compliant.
      3) The Ethernet Switch module shall contain power, status, and activity indicators. All indicators shall be visible when the Enclosure door is open for wall mounted ERn.
   b. Redundant Power Supply (RRPS)
      1) The Control Enclosure shall support an optional redundant power supply which shall automatically provide power to the control electronics upon failure or removal of the primary power supply.
      2) The redundant power supply shall assert itself seamlessly without a loss of power to the control electronics.
      3) The redundant power supply shall seamlessly remove itself when the primary power supply is reengaged.
      4) The redundant power supply shall provide visible indication that it is active.
   c. Station Bus Repeaters (ERn4 only)
      1) The Control Enclosure shall support an optional module to expand the station bus length an additional 400 meters, and the station count an additional 30 stations (62 maximum per processor/Enclosure)
      2) Wall-mount and 19" Rack-Mount versions of the Station Bus Repeaters shall also be available to support mid-span insertion away from the Control Enclosure.
   d. Station Bus Dual Repeaters (ERn4 only)
      1) The Control Enclosure shall support an optional module to expand the station bus length to two additional 400-meter segments (a total of 1200 meters from a single Enclosure, and the station count to 62 stations (62 maximum per processor/Enclosure).
      2) Wall-mount and 19" Rack-Mount versions of the Station Bus Dual Repeaters shall also be available to support mid-span insertion away from the Control Enclosure.
9. Provide the following accessories
   a. RideThru Option (RTO)
      1) The Control Enclosure shall support an optional, short-term back-up power source for the control electronics installed inside the Enclosure.
      2) RideThru Option (RTO) provides power for control electronics during brief power outages or drop outs.
      3) The short-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.

4) The short-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
5) The short-term back-up power source shall support the control electronics for at least 10 seconds.

b. BatteryPack Option (BPO – Surface Mount ERn Only)
1) The Control Enclosure shall support an optional, long-term back-up power source for the control electronics installed outside the Enclosure.
2) The long-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
3) The long-term back-up power source shall supply power to the control electronics for at least 90 minutes.
4) The long-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
5) A test switch/indicator shall be available without opening the rack door or removal of any modules/components.

C. Electrical
1. Control Enclosures shall be available in 100, 120, 230 and 240 volt, single-phase configurations.
2. Control Enclosures shall be completely pre-wired by the manufacturer. The contractor shall provide input and control wiring.
3. Control Enclosures shall be designed to support the following wire terminations:
a. AC (single phase)
b. Echelon link power (Belden 8471 or equivalent)
c. 24Vdc (2- 16AWG Wire)
d. DMX512A Port A (In or Out) (Belden 9729 or equivalent)
e. DMX512A Port B (In or Out) (Belden 9729 or equivalent)
f. RS232 Serial In/Out (Belden 9729 or equivalent)
g. Unshielded Twisted Pair (UTP) Category 5 Ethernet
h. Contact Closure In (14AWG to 26AWG Wire)
i. Contact Closure Out (14AWG to 26AWG Wire)
1) Contact Closure Out shall provide 1A @ 30vDC
4. Station Power Modules
a. Station power supply modules shall provide LinkPower for at 32 stations and 1.5A@24VDC of Auxiliary (AUX) power.
b. Station power repeater modules shall provide LinkPower for 30 stations and1.5A@24VDC of Auxiliary (AUX) power.
c. Station power module shall support over-current/short protection for LinkPower and Aux. LinkPower shall support fault detection on each leg of the balanced data bus.
5. All control wire connections shall be terminated via factory provided connectors.

D. Thermal
1. Ambient room temperature: 0-40°C / 32-104°F
2. Ambient humidity: 30-90% non-condensing.

2.03 ARCHITECTURAL CONTROL PROCESSOR: REFERENCED PRODUCT ETC UNISON PARADIGM CONTROL PROCESSOR MODULES

A. The Architectural Control Processor shall be the Unison Paradigm P-ACP Series Control Processor as manufactured by Electronic Theatre Controls, Inc.

B. Mechanical

1. The Architectural Control Processor (ACP) assembly shall be designed for use in DRd Series Dimming Enclosures and ERn Series Control Enclosures.
2. The processor shall utilize microprocessor based, solid state technology to provide multi-scene lighting and building control.
3. ACP module electronics shall be contained in a plug-in assembly.
   a. The module shall be housed in a formed steel body and contain no discrete wire connections.
      1) No tools shall be required for module removal or insertion.
4. The ACP shall be convection cooled.
5. User Interface
   a. The ACP shall utilize a backlit liquid crystal display capable of graphics and eight lines of text.
   b. The ACP shall provide an alpha-numeric keypad for data entry and navigation.
   c. The ACP shall provide a touch-sensitive control wheel for navigation.
   d. The ACP shall provide shortcut buttons to assist in navigation, selection, and data entry.
   e. The ACP keypad, buttons, and wheel shall be backlit for use in low-light conditions.
      1) The backlight shall have a user selectable time out, including no time out.
6. The ACP shall provide a front-panel RJ45 jack for Ethernet connection to the processor for configuration, live control, and web-browser-based system access.
   a. The Ethernet port shall be secured behind the locking door.
7. The ACP shall provide a Secure Digital (SD) Removable Media slot on the front panel for transfer of configuration data.
   a. The SD slot shall be secured behind the locking door.
8. The ACP shall provide a Universal Serial Bus (USB) port on the front panel for transfer of configuration data.
   a. The USB port shall be secured behind the locking door.
9. Architectural Lighting System configuration and program information shall be stored in flash memory, which does not require battery backup.
   a. The ACP shall provide a Compact Flash (CF) Card as backup flash memory and storage.
   b. The CF Card is stored in the back of the ACP, and can be accessed only by removing the ACP.
   c. The ACP data can be exchanged by inserting the CF card into another ACP.

C. Electrical
1. The ACP shall require no discrete wiring connections; all wiring shall be terminated into Dimming or Control Enclosure.
2. The ACP shall require low-voltage power supplied by the Dimming or Control enclosure.
3. The ACP shall be hot-swap capable.
4. The ACP shall support Echelon LinkPower communications with remote devices, including button stations, button/fader stations, Touchscreen stations, sensors, and third party LonMARK compliant products.
   a. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit. Touchscreen stations, interface stations and portable stations connectors will also require (2) #16 AWG wires.
   b. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.

c. Link power wiring shall permit a total wire run of 1640 ft. (500m) without a repeater. Repeater option modules shall be available to increase wiring maximums in increments of 1640 ft. (500m).
d. Link power wiring between stations shall not exceed 1313 ft. (400m).

5. The ACP shall support 10/100BaseTX, auto MDI/MDIX, 802.3af compliant Ethernet networking using TCP/IP, ESTA BSR E1.17 Advanced Control Networks (ACN) and ESTA BSR E1.31 (sACN) Protocols for internal communication and integration with third-party equipment.
6. The ACP shall support EIA-RS232 serial protocol for bi-directional command and communication with third-party equipment.
7. The ACP shall support two discrete ESTA DMX512A ports, configurable as input or output ports.°
   a. °When used in a Dimming Enclosure, the second port is always an output port.
8. The ACP shall provide four onboard dry contact closure inputs for integration with third-party products.
9. The ACP shall provide four onboard contact closure outputs, rated at 1A@30VDC, for integration with third-party equipment.

D. Functional
1. Capacity
   a. Shall support 1024 channels of control
   b. Shall support 2 physical DMX ports, each of which may be configured as an input or output
2. System
   a. Runtime application shall utilize support Net3 system interoperability
   b. System shall support the use of Network Time Protocol for real time clock synchronization
   c. System shall support remote firmware upload an over Ethernet connection from a connected PC running the Light Designer software or another connected processor.
   d. System shall support local firmware upload from removable media (SD Card, USB Flash Drive)
3. Diagnostics
   a. Shall output an Event log
   b. Standard log shall store a fixed-length history of recent activity
   c. Separate critical log shall only store important messages (such as boot-up settings)
4. Configuration Data
   a. Configuration Data can be uploaded over an Ethernet connection from a PC running Light Designer application
   b. Configuration Data can be retrieved from another Paradigm Processor
   c. A Paradigm Processor shall make its configuration data available for retrieval by another Processor as a backup/recovery mechanism
   d. Configuration Data shall be stored on solid-state media that can be removed to facilitate transfer between Processor units
   e. Configuration Data may be loaded to and from removable media access provided on front panel
   f. Configuration Data for the entire System shall be available for download from any single Processor
   g. Shall store configuration data for Dimming enclosure processors and shall make available for download
5. Scalability
   a. Adding additional Processors to a System shall proportionately increase its overall capabilities up to a maximum System size

b. The maximum number of Processors configured as a System shall be at least 12.
c. Multiple Processors shall utilize the Ethernet network to remain time synchronized and share control information
d. Multiple Processors shall utilize the Ethernet network to maintain configuration data synchronization as modifications are made
e. Failure of a single Processor shall not prohibit continuing operation of the remaining Processors
f. It shall be possible for multiple Systems to coexist on the same physical network with logical isolation between Systems

6. Local User Interface
   a. Shall provide access to Processor setup (IP address)
   b. Shall provide access to Processor status and diagnostics
   c. Where the Processor is installed within a Dimming enclosure, shall provide access to Dimming enclosure setup, status and diagnostics
   d. Shall provide control functionality for Control Channels, Zones, Fixtures, Groups, Presets, Macros, Walls and Sequences within the current configuration.
   e. Shall provide functionality to schedule astronomical and real time events (add/edit/delete)
   f. Shall allow for display of local DMX information
   g. Shall allow for transfer of log files to local removable media
   h. Shall allow to perform firmware upgrades for connected Dimming enclosures
   i. Shall allow for transfer of configuration to and from Dimming enclosures using removable media
   j. Shall allow for transfer of configuration to and from LCD Stations using removable media
   k. Shall allow for binding of Stations
7. Access Controls
   a. There shall be 2 user accounts - Administrator, and User with separate password protection
   b. Account and password settings shall be local to each Processor
   c. Access Controls shall be applied to certain areas of the Paradigm Local User Interface and Web Interface
8. Web User Interface
   a. Shall be an internal web server accessible via Ethernet port
   b. Shall support common web browsers on Windows and Mac platforms
   c. Shall provide functionality to Activate and Deactivate Presets
   d. Shall provide functionality to schedule timed events (add/delete)
   e. Shall display status information
   f. Shall display log files
   g. Shall allow for configuration of Processor settings (date, time)
   h. Shall allow for upload and download of configuration data
   i. There shall be links to other web-enabled devices in the System, including other Paradigm Processors
9. Stations
   a. Stations shall be connected to a Paradigm Processor via a LinkPower network or Ethernet
   b. Station discovery and binding shall be accomplished from the Local User Interface or Light Designer
10. Net3 and ACN Devices
    a. Net3 Devices shall be connected to and controlled from Paradigm Processors via Ethernet
    b. Paradigm Processors shall provide DMX-Net3 gateway functionality

c. It shall be possible to send and receive Macro triggers defined within the System configuration via Net3
d. There shall be support for Streaming ACN on up to 24 universes per Processor

11. Operation
a. When contained in an dimming enclosure, a snapshot of the dimming enclosure output data shall be stored in persistent memory so that hardware can access it for immediate output on boot
b. DMX output refresh rate shall be configurable
c. There shall be support for 16-bit DMX Attributes
d. DMX inputs may be patched to DMX and Streaming ACN outputs as external sources
e. Streaming ACN inputs shall be patched to DMX outputs (gateway) as external sources
f. Where there are multiple external sources then priority and HTP shall be used to perform arbitration
g. External and internal sources shall be arbitrated based on user-selection of standard or custom rules
h. On Preset Record, the values of Attributes within the Preset shall be updated to reflect the current output
i. The total output may be the combination of many different Presets running concurrently
j. There shall be no hard limit on number of concurrent cross fades
k. Multiple Presets controlling the same Attribute shall first interact based on priority and second based on Latest Takes Precedence(LTP) or Highest Takes Precedence (HTP)
l. LTP and HTP operation shall be supported simultaneously and interact (at the same priority) using HTP
m. Settings due to LTP Presets may be automatically discarded from operation when overridden
n. It shall be possible to specify that a Preset or Attribute Control will persist when overridden
o. A Preset may be designated as an HTP Override and shall cause HTP values to be discarded
p. It shall be possible to modify the rate of a Preset (Cross fades, Effects) from a Control within the System
q. Each Preset shall have a status that can be Activated, Deactivated or Altered
r. Preset status may be set based on matching levels in the current output as an option
s. On startup the System shall be capable of automatically executing timed events within the previous 24 hours to synchronize its initial output state with the current time of day

12. Serial Input/Output
a. RS232 shall support 8-bit word length, parity selection and 1 or 2 stop bits
b. RS232 shall support baud rates from 4800 to 115,200 bps
c. Serial input and output messages are fully customizable
d. Serial output messages can be generated by any Control or Event

2.04 ARCHITECTURAL CONTROL PROCESSOR: REFERENCED PRODUCT ETC UNISON STATION POWER MODULE

A. Station processor Modules
1. The Station Power Module shall be the Unison Paradigm P-SPM Series Station Power Module as manufactured by Electronic Theatre Controls, Inc., or equal.

B. Mechanical
1. The Station Power Module (SPM) assembly shall be designed for use in DRd Series or ERn Rack Enclosures.
2. The SPM shall convert input power into low-voltage (Class II) power with data line and a secondary auxiliary low-voltage line to energize button, button/fader, touchscreen, and interface devices for multi-scene lighting and building control.
3. SPM module shall be contained in a plug-in assembly.
   a. The module shall be housed in a formed steel body and contain no discrete wire connections.
      1) No tools shall be required for module removal or insertion.
4. The SPM shall be convection cooled.
5. User Interface
   a. The SPM shall utilize light emitting diodes (LED's) to indication function, status and fault.
6. The SPM shall be secured behind the locking door.
7. Wall-mounted, direct wire and 19" rack-mount, connectorized repeater and dual-repeater variants shall be available from the same manufacturer where required on the project.

C. Electrical
1. The SPM shall require no discrete wiring connections; all wiring shall be terminated into the dimming enclosure, unless required by a variant.
2. The SPM shall require line-voltage power supplied by the contractor, terminated inside the dimming or control enclosure.
3. The SPM shall be hot-swap capable.
4. The SPM, in conjunction with a matching Architectural Control Processor (ACP), shall support Echelon LinkPower communications with remote devices, including button, button/fader, touchscreen and interface stations, and shall interoperate with LonMARK-approved third-party devices.
   a. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit.
   b. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
      1) Link power wiring shall permit a total wire run of 1640 ft. (500m)
      2) Repeaters allow an additional wire run of 1640 ft. (500m)
   c. Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
5. Link power wiring between stations shall not exceed 1313 ft. (400m).
6. The SPM shall support auxiliary power for certain remote devices, including touchscreen and interface stations, as required by the device.
   a. The auxiliary power network shall utilize polarity-dependent, low-voltage Class II wiring, consisting of two # 16 AWG wires.
   b. Auxiliary wiring shall permit a total wire run of 1640 ft. (500m)
      1) Repeaters allow an additional wire run of 1640 ft. (500m)
      2) Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
   c. The SPM shall supply 1.25 amps at 24v DC continuously.

D. Functional
1. Capacity
   a. Each SPM shall:
      1) Supply power for up to 32 button and button/fader stations.
         a) Repeaters and dual-repeaters allow 30 additional stations, 62 total
   b. Supply auxiliary power for a similar number of interface stations.

c. Shall supply auxiliary power for up to four Touchscreen stations, when a like number of other stations are deducted from the total.
   1) Repeaters and dual-repeaters allow two additional Touchscreens (six total) when a like number of other stations are deducted from the total.

2. Operation
   a. The SPM shall not require configuration or programming.
   b. The SPM shall automatically detect faults in the wiring, indicate the fault, including the fault polarity, and shut down the output power.
      1) The SPM shall automatically reset when the fault is clear, and can be manually reset by removing and re-inserting the module.

2.05 WI-FI ROUTER/INTELLIGENT WIRELESS MESH SYSTEM: REFERENCED PRODUCT LINKSYS VELOP INTELLIGENT MESH WI-FI SYSTEM ACXXXX

A. Overview:
   1. System incorporates an Intelligent Mesh Technology Wi-Fi system that delivers seamless connectivity with the ability to mix and match nodes in order to modify performance.
   2. Each node provides a powerful Wi-Fi signal throughout the entire coverage area by continuously self-organizing and optimizing to find the fastest path to the Internet for seamless Wi-Fi.
   3. Provides an ultra-simple and powerful system that uses only one Wi-Fi network name and password for secure Wi-Fi. Leading-edge security allows content blocking. System is compatible with all Internet service provider supplied equipment and speeds. Setup is via an app-based interface.
   4. The system self-heals and self-optimizes to consistently deliver fast, hassle-free Wi-Fi.
   5. Software updates are automatic.

B. What's in the Box:
   1. Linksys Velop Dual Band Node
   2. Power supply
   3. Ethernet cable

C. Technical Specifications:
   1. Wi-Fi Technology:
      a. Dual-Band AC1300 (867 + 400 Mbps) ‡ with MU-MIMO and 256 QAM
   2. Key Features:
      a. Dual-Band Wi-Fi Mesh System
      b. Seamless Wi-Fi
      c. Easy App Controls
      d. Intelligent MeshTM Technology - Self-Organizing, Self-Optimizing and Self-Healing
      e. One Wi-Fi Network
      f. Auto Firmware Upgrade
      g. Parental Control
      h. Guest Access
      i. Auto sensing WAN/LAN Ports
      j. Wired/Wireless Backhaul
      k. AP/Bridge Mode Mesh Wi-Fi System
      l. Spot Finder- Mesh system uses signal strength, throughput, and latency to determine the optimal placement during set-up and post set-up.
      m. Auto Wi-Fi Channel
      n. Bluetooth 4.1 embedded
      o. Speedtest support

p. Amazon Alexa support
q. 3-Year Warranty and Support

3. Network Standards: 802.11b
   a. 802.11a
   b. 802.11g
   c. 802.11n
   d. 802.11ac
4. Wi-Fi Speed:
   a. AC1300 (867 + 400 Mbps)
5. Wi-Fi Bands:
   a. 2.4Ghz + 5GHz
6. Wi-Fi Range:
   a. up to 1500 sq ft
7. Number of Ethernet Ports:
   a. 2x WAN/LAN auto-sensing Gigabit Ethernet ports
8. Other Ports:
   a. power jack
   b. power switch
   c. reset button
9. Antennas:
   a. 3x internal antennas and high-powered amplifiers
10. Processor:
    a. 716 MHz Quad Core
11. Memory:
    a. 256 MB NAND Flash and 256 MB DDR3
12. LEDs:
    a. One LED indicator
13. Wireless Encryption:
    a. WPA2 personal
14. Easy Setup:
    a. Simple and secured App based set-up
    b. Required for set-up:
       1) Internet connection with Modem.
       2) Mobile device with Android 4.4 or iOS 9 and higher, Bluetooth preferred.
15. Minimum System Requirements:
    a. Required for set-up - Simple and secured App based set-up: Mobile devices with Android 4.0.3 or iOS 8 and higher
16. Dimensions (L x W x H):
    a. 3.1" x 3.1" x 5.55" per Node
17. Weight:
    a. 2.076 Lbs.
18. Security Features:
    a. WPA2 personal
19. Regulatory Compliance:
    a. FCC class B
20. Additional Information:
    a. Bluetooth 4.0/LE for secure and easy App based set-up
21. Power Supply:
    a. Input: 100-240V ~ 50-60Hz; Output: 12V, 1.0A

D. Warranty:
   1. Three-year limited

2.06 GENERAL NETWORK:

A. General
1. The Electronic Theatre Controls Net3 network shall provide data distribution over a TCP/IP network. Data shall be layer 3 routable over the Ethernet network. Systems using proprietary formats or formats other than TCP/IP or non-layer 3 routable networks shall not be accepted.
2. Connections shall be made between consoles, facepanels, architectural processors, computers and Net3 Gateways over standard Ethernet distribution systems using 10/100BaseT wiring and/or 10/100BaseFL. All installations shall conform to established Ethernet wiring practice and installation shall be performed by contractors qualified to do this type of work. All wiring shall be tested at Category 5 or higher for full bandwidth operation to the appropriate IEEE standard.
3. The Lighting Control system must be supplied by a single manufacturer and must have seamless integration over Ethernet between the Entertainment and Architectural lighting control.

B. Capacities
1. The network shall provide DMX routing, patching, and prioritization for choice of up to 32,910,848 DMX addresses. Each address may be input or output from any port on any DMX Gateway in the system. DMX input, routing and output shall be specifically supported on the system from multiple sources and locations up to the maximum number of Gateways supported by the Ethernet topology.
2. The network shall support multiple consoles, computers, file servers, printers, and architectural processors with discrete command lines and control. The Net3 network shall support multiple venues/systems on the same network.
3. Network configuration shall be via ETC Gateway Configuration Editor (GCE) software. The software shall permit complete user flexibility allowing the system operator to patch DMX data over Ethernet DMX (EDMX), assign Gateway labels for easy identification, assign DMX offsets and provide choice of DMX port prioritization. Each Gateway shall have a specific IP address provided automatically by the software. The user may edit this IP address. Systems that do not support simple Windows configuration, or systems that do not allow complete reconfiguration of the above mentioned features over Ethernet shall not be acceptable.
4. All configuration data for each network device shall be held at the device and system operation shall not require continuous on-line operation of the network configuration software.
5. Architectural and Entertainment systems connected to the same Net3 network shall be capable of arbitrating control over EDMX data. The system shall be capable of alternating control of individual dimmer data between architectural and entertainment systems without intervention by the user. The user shall dictate the conditions under which system shall automatically take control and the network shall allow user override of the user selected defaults. Systems which require direct user intervention to allocate control of dimmers between architectural and entertainment lighting systems shall not be allowed.
6. The Net3 network shall allow multiple DMX inputs assigned to the same EDMX range to be set at different priorities. This shall allow the user to assign high or low priority to each DMX input port in the network on a port by port basis. The network shall require a valid DMX signal present at the input to initiate prioritization. Systems that do not allow for prioritization shall not be allowed.

C. Operational Features
1. The video monitor outputs at any Net3 Remote Video Interface (RVI) shall be able to monitor the video output of any Net3 console connected to the network.

2. Each DMX Gateway shall control up to 512 DMX addresses per port, within the confines of up to 64,279 DMX (32,910,848 address) “universes”. The specific DMX data input or output by the Gateway shall be freely configurable by the user. Duplicate outputs of DMX lines (DMX splitter) and discrete outputs shall be fully supported.
3. Any number of DMX universes may be configured with any length up to 512 addresses as long as the total does not exceed 32,910,848. Any range of DMX addresses may be selected for each. Multiple sources may be combined and a priority may be assigned to each source. Each DMX input may have its own universe and offset address for ease of use.
4. DMX ports shall be configurable for either input or output. Multiple DMX signal routing patches and multiple facilities shall be specifically supported and limited only by the file storage capacity of the computer with ETC Network Configuration Editor software installed.
5. File transmission, synchronization and access to software shall be supported.

2.07 DUAL BAND ENTERPRISE CLASS WIRELESS ACCESS POINT: REFERENCED PRODUCT CISCO AIRONET 1600 SERIES ACCESS POINT

A. FEATURES:

1. Sleek design with internal antennas
2. Extended operating temperature
3. Versatile RF coverage with optional external antennas
4. UL 2043 plenum-rated for above-ceiling installation options or suspended from drop ceilings
5. 802.11n performance with existing PoE switches
6. Locks for theft protection
7. Controller-based or standalone deployment options
8. Supports rogue access point detection and denial-of service attacks
9. Management frame protection detects malicious users and alerts network administrators
10. Cisco ClientLink 2.0 Beamforming
11. Support for all client types without any client requirements or dependencies
12. Cisco CleanAir Express Spectrum Intelligence
13. Identifies, classifies and provides automatic remedial actions for different types of interference
14. Locates and visualizes sources of interference
15. Cisco VideoStream Technology
16. Efficient multicast-to-unicast conversion

17. Video call admission control to prevent oversubscription

18. Queue prioritization to help ensure best user experience for corporate videos

19. Warranty: Limited Lifetime Warranty that provides full warranty coverage of the hardware for as long as the original end user continues to own or use the product. The warranty includes 10-day advance hardware replacement and ensures that software media is defect-free for 90 days.

20. Enterprise-class chipsets and optimized radios

21. 802.11n with 3x3 multiple-input multiple-output (MIMO) technology with two spatial streams, which sustains 300-Mbps rates

22. Radio resource management (RRM): Automated self-healing

23. CleanAir Express: detects RF interference and provides basic spectrum analysis capability

24. Cisco ClientLink 2.0 technology: Improves downlink performance to all mobile devices including 802.11n while improving battery life on mobile devices such as smartphones and tablets

25. Cisco BandSelect technology: Improves 5-GHz client connections in mixed-client environments

26. Cisco VideoStream technology: Uses multicast to improve rich-media applications

27. Can scale to up to 18,000 access points with full Layer 3 mobility across central or remote locations

28. Cisco Network Assistant: provides a centralized network view with a user-friendly GUI

SPECIFICATIONS:

Product Specifications

Table 1 lists the product specifications for Cisco Aironet 1600 Series Access Points.

Table 1. Product Specifications for Cisco Aironet 1600 Series Access Points

Item	Specification
Part Numbers	**The Cisco Aironet 1600i Access Point: Indoor environments, with internal antennas** • AIR-CAP1602I-x-K9 Dual-band controller-based 802.11a/g/n • AIR-CAP1602I-xK910 Eco-pack (dual-band controller-based 802.11a/g/n) 10 quantity access points • AIR-SAP1602I-x-K9 Dual-band stand-alone 802.11a/g/n • AIR-SAP1602I-xK9-5 Eco-pack (dual-band stand-alone 802.11a/g/n) 5 quantity access points **The Cisco Aironet 1600e Access Point: Indoor, challenging environments, with external antennas** • AIR-CAP1602E-x-K9 Dual-band controller-based 802.11a/g/n • AIR-CAP1602E-xK910 Eco-pack (dual-band 802.11a/g/n) 10 quantity access points • AIR-SAP1602E-x-K9 Dual-band stand-alone 802.11a/g/n • AIR-SAP1602E-xK9-5 Eco-pack (dual-band stand-alone 802.11a/g/n) 5 quantity access points

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td></td><td>Cisco SMARTnet® Service for the Cisco Aironet 1600 Series Access Point with internal and external antennas
• CON-SNT-C1602Ix - SMARTnet 8x5xNBD 1600i access point (dual-band 802.11 a/g/n, Controller-based), (e.g. CON-SNT-C1602IE for AP1600 internal antenna for E Domain, Controller based)
• CON-SNT-C1602Ex - SMARTnet 8x5xNBD 1600e access point (dual-band 802.11 a/g/n, Controller-based), (e.g. CON-SNT-C1602EA for AP1600 external antenna for A Domain, Controller based)
• CON-SNT-S1602Ix - SMARTnet 8x5xNBD 1600i access point (dual-band 802.11 a/g/n, Stand-alone), (e.g. CON-SNT-S1602IE for AP1600 internal antenna for E Domain, stand-alone)
• CON-SNT-S1602Ex - SMARTnet 8x5xNBD 1600e access point (dual-band 802.11 a/g/n, Stand-alone), (e.g. CON-SNT-S1602EA for AP1600 external antenna for A Domain, Stand-alone)
Cisco Wireless LAN Services
• AS-WLAN-CNSLT Cisco Wireless LAN Network Planning and Design Service
• AS-WLAN-CNSLT Cisco Wireless LAN 802.11n Migration Service
• AS-WLAN-CNSLT Cisco Wireless LAN Performance and Security Assessment Service
Regulatory domains: (x = regulatory domain)
Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, please visit: http://www.cisco.com/go/aironet/compliance.
Not all regulatory domains have been approved. As they are approved, the part numbers will be available on the Global Price List.</td></tr>
<tr><td>Software</td><td>• Cisco Unified Wireless Network Software (available in Q4CY12)
• Cisco IOS® Software Release (available in Q4CY12)</td></tr>
<tr><td>802.11n</td><td>• 3 x 3 multiple-input multiple-output (MIMO) with two spatial streams
• Maximal ratio combining (MRC)
• 20- and 40-MHz channels
• PHY data rates up to 300 Mbps
• Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx)
• 802.11 dynamic frequency selection (DFS) (Bin 5)
• Cyclic shift diversity (CSD) support</td></tr>
<tr><td>Data Rates Supported</td><td>802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps
802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps
802.11n data rates (2.4 GHz[1] and 5 GHz):
<table>
<tr><th rowspan="2">MCS Index[2]</th><th colspan="2">GI[3] = 800ns</th><th colspan="2">GI = 400ns</th></tr>
<tr><th>20-MHz Rate (Mbps)</th><th>40-MHz Rate (Mbps)</th><th>20-MHz Rate (Mbps)</th><th>40-MHz Rate (Mbps)</th></tr>
<tr><td>0</td><td>6.5</td><td>13.5</td><td>7.2</td><td>15</td></tr>
<tr><td>1</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr>
<tr><td>2</td><td>19.5</td><td>40.5</td><td>21.7</td><td>45</td></tr>
<tr><td>3</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr>
<tr><td>4</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr>
<tr><td>5</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr>
<tr><td>6</td><td>58.5</td><td>121.5</td><td>65</td><td>135</td></tr>
<tr><td>7</td><td>65</td><td>135</td><td>72.2</td><td>150</td></tr>
<tr><td>8</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr>
<tr><td>9</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr>
<tr><td>10</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr>
<tr><td>11</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr>
<tr><td>12</td><td>78</td><td>162</td><td>86.7</td><td>180</td></tr>
<tr><td>13</td><td>104</td><td>216</td><td>115.6</td><td>240</td></tr>
</table></td></tr>
</table>

[1] 2.4 GHz: 2 GHz does not support 40 MHz.

[2] MCS Index: The Modulation and Coding Scheme (MCS) index determines the number of spatial streams, the modulation, the coding rate, and data rate values.

[3] GI: A Guard Interval (GI) between symbols helps receivers overcome the effects of multipath delays.

Item	Specification				
	14	117	243	130	270
	15	130	270	144.4	300
Frequency Band and 20-MHz Operating Channels	**A Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels **C Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.745 to 5.825 GHz; 5 channels **E Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) **I Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels **K Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.620 GHz; 7 channels • 5.745 to 5.805 GHz; 4 channels		**N Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.745 to 5.825 GHz; 5 channels **Q Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 11 channels **R Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.660 to 5.700 GHz; 3 channels • 5.745 to 5.805 GHz; 4 channels **S Regulatory Domain:** • 2.412 to 2.472 GHz; 13 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 11 channels • 5.745 to 5.825 GHz; 5 channels **T Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.280 to 5.320 GHz; 3 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels **Z Regulatory Domain:** • 2.412 to 2.462 GHz; 11 channels • 5.180 to 5.320 GHz; 8 channels • 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) • 5.745 to 5.825 GHz; 5 channels		
Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.					
Maximum Number of Nonoverlapping Channels	**2.4 GHz** • 802.11b/g: ◦ 20 MHz: 3 • 802.11n: ◦ 20 MHz: 3		**5 GHz** • 802.11a: ◦ 20 MHz: 24 • 802.11n: ◦ 20 MHz: 24 ◦ 40 MHz: 11		
Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.					
Receive Sensitivity	**2.4 GHz** **802.11b** -101 dBm @ 1 Mb/s -99 dBm @ 2 Mb/s -92 dBm @ 5.5 Mb/s -89 dBm @ 11 Mb/s	**2.4 GHz** **802.11g** -93 dBm @ 6 Mb/s -93 dBm @ 9 Mb/s -92 dBm @ 12 Mb/s -90 dBm @ 18 Mb/s -87 dBm @ 24 Mb/s -85 dBm @ 36 Mb/s -80 dBm @ 48 Mb/s -79 dBm @ 54 Mb/s	**5 GHz** **802.11a** -92 dBm @ 6 Mb/s -91 dBm @ 9 Mb/s -91 dBm @ 12 Mb/s -89 dBm @ 18 Mb/s -86 dBm @ 24 Mb/s -83 dBm @ 36 Mb/s -79 dBm @ 48 Mb/s -78 dBm @ 54 Mb/s		

Item	Specification			
	2.4 GHz **802.11n (HT20)** -93 dBm @ MCS0 -91 dBm @ MCS1 -89 dBm @ MCS2 -86 dBm @ MCS3 -83 dBm @ MCS4 -78 dBm @ MCS5 -77 dBm @ MCS6 -76 dBm @ MCS7 -93 dBm @ MCS8 -90 dBm @ MCS9 -88 dBm @ MCS10 -85 dBm @ MCS11 -81 dBm @ MCS12 -77 dBm @ MCS13 -76 dBm @ MCS14 -74 dBm @ MCS15		**5 GHz** **802.11n (HT20)** -92 dBm @ MCS0 -89 dBm @ MCS1 -88 dBm @ MCS2 -85 dBm @ MCS3 -82 dBm @ MCS4 -77 dBm @ MCS5 -76 dBm @ MCS6 -75 dBm @ MCS7 -91 dBm @ MCS8 -88 dBm @ MCS9 -87 dBm @ MCS10 -84 dBm @ MCS11 -81 dBm @ MCS12 -76 dBm @ MCS13 -75 dBm @ MCS14 -73 dBm @ MCS15	**5 GHz** **802.11n (HT40)** -88 dBm @ MCS0 -87 dBm @ MCS1 -85 dBm @ MCS2 -82 dBm @ MCS3 -79 dBm @ MCS4 -74 dBm @ MCS5 -73 dBm @ MCS6 -72 dBm @ MCS7 -88 dBm @ MCS8 -86 dBm @ MCS9 -84 dBm @ MCS10 -81 dBm @ MCS11 -78 dBm @ MCS12 -73 dBm @ MCS13 -72 dBm @ MCS14 -70 dBm @ MCS15
Maximum Total Transmit Power	**2.4 GHz** • 802.11b ◦ 22 dBm (3 antennas enabled) • 802.11g ◦ 22 dBm (3 antennas enabled) • 802.11n (HT20) ◦ 22 dBm (3 antennas enabled)		**5 GHz** • 802.11a ◦ 22 dBm (3 antennas enabled) • 802.11n non-HT duplicate mode ◦ 22 dBm (3 antennas enabled) • 802.11n (HT20) ◦ 22 dBm (3 antennas enabled) • 802.11n (HT40) ◦ 22 dBm (3 antennas enabled)	
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.				
Available Total Transmit Power Settings	**2.4 GHz**			**5 GHz**		
	Enabled antennas:			Enabled antennas:		
	1	2	3	1	2	3
	17 dBm 14 dBm 11 dBm 8 dBm 5 dBm 2 dBm	20 dBm 17 dBm 14 dBm 11 dBm 8 dBm 5 dBm	22 dBm 19 dBm 16 dBm 13 dBm 10 dBm 7 dBm	17 dBm 14 dBm 11 dBm 8 dBm 5 dBm 2 dBm	20 dBm 17 dBm 14 dBm 11 dBm 8 dBm 5 dBm	22 dBm 19 dBm 16 dBm 13 dBm 10 dBm 7 dBm
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.						
Integrated Antenna	• 2.4 GHz, gain 4.0 dBi, horizontal beamwidth 360° • 5 GHz, gain 4.0 dBi, horizontal beamwidth 360°					
External Antenna (Sold Separately)	• Certified for use with antenna gains up to 6 dBi (2.4 GHz and 5 GHz) • Cisco offers the industry's broadest selection of 802.11n antennas delivering optimal coverage for a variety of deployment scenarios					
Interfaces	• 10/100/1000BASE-T autosensing (RJ-45) • Management console port (RJ-45)					
Indicators	• Status LED indicates boot loader status, association status, operating status, boot loader warnings, boot loader errors					
Dimensions (W x L x H)	• Access point (without mounting bracket): 8.7 x 8.7 x 1.84 in. (22.1 x 22.1 x 4.7 cm)					
Weight	• 1.9 lbs. (0.86 kg)					

Item	Specification
Environmental	**Cisco Aironet 1600i** • Nonoperating (storage) temperature: -22 to 158°F (-30 to 70°C) • Nonoperating (storage) Altitude Test -25°C, 15,000 ft. • Operating temperature: 32 to 104°F (0 to 40°C) • Operating humidity: 10 to 90% percent (noncondensing) • Operating Altitude Test -40°C, 9843 ft. **Cisco Aironet 1600e** • Nonoperating (storage) temperature: -22 to 158°F (-30 to 70°C) • Nonoperating (storage) Altitude Test - 25°C, 15,000 ft. • Operating temperature: -4 to 122°F (-20 to 50°C) • Operating humidity: 10 to 90 percent (noncondensing) • Operating Altitude Test -40°C, 9843 ft
System Memory	• 256 MB DRAM • 32 MB flash
Input Power Requirements	• AP1600: 44 to 57 VDC • Power Supply and Power Injector: 100 to 240 VAC; 50 to 60 Hz
Powering Options	• 802.3af Ethernet Switch • Cisco AP1600 Power Injectors (AIR-PWRINJ4=, AIR-PWRINJ5=) • Cisco AP1600 Local Power Supply (AIR-PWR-B=)
Power Draw	• AP1600: 12.95 W **Note:** When deployed using PoE, the power drawn from the power sourcing equipment will be higher by some amount dependent on the length of the interconnecting cable. This additional power may be as high as 2.45W, bringing the total system power draw (access point + cabling) to 15.4W.
Warranty	Limited Lifetime Hardware Warranty
Compliance	**Standards** • **Safety:** ◦ UL 60950-1 ◦ CAN/CSA-C22.2 No. 60950-1 ◦ UL 2043 ◦ IEC 60950-1 ◦ EN 60950-1 • **Radio approvals:** ◦ FCC Part 15.247, 15.407 ◦ RSS-210 (Canada) ◦ EN 300.328, EN 301.893 (Europe) ◦ ARIB-STD 33 (Japan) ◦ ARIB-STD 66 (Japan) ◦ ARIB-STD T71 (Japan) ◦ AS/NZS 4268.2003 (Australia and New Zealand) ◦ EMI and susceptibility (Class B) ◦ FCC Part 15.107 and 15.109 ◦ ICES-003 (Canada) ◦ VCCI (Japan) ◦ EN 301.489-1 and -17 (Europe) ◦ EN 60601-1-2 EMC requirements for the Medical Directive 93/42/EEC • **IEEE Standard:** ◦ IEEE 802.11a/b/g, IEEE 802.11n, IEEE 802.11h, IEEE 802.11d • **Security:** ◦ 802.11i, Wi-Fi Protected Access 2 (WPA2), WPA ◦ 802.1X ◦ Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP) • **EAP Type(s):** ◦ Extensible Authentication Protocol-Transport Layer Security (EAP-TLS) ◦ EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2) ◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2

Item	Specification
	◦ Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST) ◦ PEAPv1 or EAP-Generic Token Card (GTC) ◦ EAP-Subscriber Identity Module (SIM) • **Multimedia:** ◦ Wi-Fi Multimedia (WMM™) • **Other:** ◦ FCC Bulletin OET-65C ◦ RSS-102

2.08 ARCHITECTURAL BUTTON, FADER & INTERFACE STATIONS: REFERENCED PRODUCT ETC UNISON HERITAGE STATIONS

A. Button Stations

1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
2. Mechanical
   a. Unison Heritage Button stations shall operate using up to ten programmable buttons.
   b. All button stations shall be available with white, cream, ivory, gray or black faceplates and buttons.
      1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
   c. Stations shall have indicators lights at each button or fader.
      1) Indicators shall be comprised of red, green and blue LED's.
      2) Indicator color and state (steady On, Blink, Off) shall be configured in software, and shall operate relative to the button or fader it is associated with.
   d. All faceplates shall be designed for flush or surface mounting.
   e. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
   f. Station faceplates shall be indelibly marked for each button or fader function.
   g. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.
   h. All Button and Button/Fader stations shall be shall be designed to accept the infrared signal from a remote hand held IR transmitter.
      1) The stations shall have a 60° reception angle and shall operate reliably within a 45' distance.
   i. IR Transmitters shall be available in seven or twelve button configurations. Custom transmitters may have up to 10 programmable buttons.
      1) IR transmitters shall be mounted in a hand-held black plastic controller. Transmitter dimensions shall be 1.875” wide, 6.625” long and 0.60” deep.
3. Electrical
   a. Unison control station wiring shall be an Echelon® Link power network.
      1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
      2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
      3) Network wiring may be bus, loop, home run, star or any combination of these.
      4) Network insulation displacement connectors shall be provided with all stations.

4. Functional
   a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.
      1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
         a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
         b) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
      2) System macros and sequences shall be programmable via LightDesigner system software.
         a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
         b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
      3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
         a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
         b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
   b. Station Button, Button/Fader, and Interface control components shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
      1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, cue light, or room join/separate.
      2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.
   c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

B. Button/Fader Stations
   1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
   2. Mechanical
      a. Unison Heritage Button/Fader Stations shall operate using up to sixteen programmable faders and twelve programmable buttons.
      b. All button/fader stations shall be available with white, cream, ivory, gray or black faceplates, fader knobs, and buttons.
         1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
      c. Fader stations shall utilize standard 45-millimeter slide potentiometers.
      d. Stations shall have indicators lights at each button or fader.
         1) Indicators shall be comprised of red, green and blue LED's

2) Indicator color and state (steady On, Blink, Off) shall be configured in software, and shall operate relative to the button or fader it is associated with.

e. All faceplates shall be designed for flush or surface mounting.

f. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.

g. Station faceplates shall be indelibly marked for each button or fader function.

h. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.

i. All Button and Button/Fader stations shall be shall be designed to accept the infrared signal from a remote hand held IR transmitter.

1) The stations shall have a 60° reception angle and shall operate reliably within a 45' distance.

j. IR Transmitters shall be available in seven or twelve button configurations. Custom transmitters may have up to 10 programmable buttons.

1) IR transmitters shall be mounted in a hand-held black plastic controller. Transmitter dimensions shall be 1.875” wide, 6.625” long and 0.60” deep.

3. Electrical

a. Unison control station wiring shall be an Echelon® Link power network.

1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).

2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.

3) Network wiring may be bus, loop, home run, star or any combination of these.

4) Network insulation displacement connectors shall be provided with all stations.

4. Functional

a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface, or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.

1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.

a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.

b) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.

2) System macros and sequences shall be programmable via LightDesigner system software.

a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.

b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.

3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.

a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday,

weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.

b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.

b. Station Button, Button/Fader, and Interface) control components shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.

1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, cue light, or room join/separate.

2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.

c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

C. Connector Stations

1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.

2. Mechanical

a. Unison connector stations shall provide an interface to portable Unison stations.

b. All connector stations shall be available with white, cream, ivory, gray or black faceplates, fader knobs, and buttons.

1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.

c. All faceplates shall be designed for flush or surface mounting.

d. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.

e. Station faceplates shall be indelibly marked for each function.

f. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.

3. Electrical

a. Unison control station wiring shall be an Echelon® Link power network.

1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).

2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.

3) Network wiring may be bus, loop, home run, star or any combination of these.

4) Network insulation displacement connectors shall be provided with all stations.

4. Functional

a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.

1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.

a) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
b) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.

2) System macros and sequences shall be programmable via LightDesigner system software.
a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.

3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.

b. Station Button, Button/Fader, and Interface control components shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, cue light, or room join/separate.
2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.

c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.

D. Contact Interface Station
1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
2. General
a. Unison Contact Interface shall provide direct interface (in and out) to external devices via contact closure. Interface enclosure shall consist of 16 input connections and 16 output connections.
3. Mechanical
a. The surface mount enclosure and cover shall be constructed of 16-gauge (.08) steel and are finished in black smooth matte powder coat paint. The enclosure shall be 14” W x 10.5” H x 3” D.
b. Conduit access points shall be provided on the top and bottom of the unit.
c. The assembly shall consist of up to 16 connections; 8 inputs functionally coupled with 8 normally open relay contact outputs. Inputs and outputs may be configured as either maintained or momentary.
4. Electrical
a. Unison control station wiring shall be an Echelon® Link power network.

1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
3) Network wiring may be bus, loop, home run, star or any combination of these.
4) Network insulation displacement connectors shall be provided with all stations.

b. Ratings:
1) The Input Rating shall be 5V@10mA (unit requires dry contact closure)
2) Dry contact outputs shall consist of:
a) Normally-Open 2-pole contact closure outputs: 1A@30Vdc & .5A@120V.

2.09 TOUCHSCREEN CONTROL STATIONS: REFERENCED PRODUCT ETC UNISON PARADIGM TOUCHSCREEN

A. The Touchscreen Control Stations shall be the Unison Paradigm Touchscreen P-LCD Series Control Stations as manufactured by Electronic Theatre Controls, Inc.

B. General
1. Touchscreen stations shall support default and fully graphical control pages.
2. The Touchscreen station shall operate using graphic buttons, faders and other images on at least 30 separate programmable control pages.
3. Touchscreen stations shall also allow programming of page pass-code, lock out and visibility levels.

C. Mechanical
1. Touchscreen stations shall consist of a seven inch, backlit liquid crystal display (LCD) with a minimum resolution of 800 by 400 pixels and 12-bit color depth with a touch interface.
2. Touchscreen bezels shall be constructed of aluminum and shall have no visible means of attachment.
a. The bezel shall install and remove without the use of tools.
b. The bezel shall provide two working positions for the Touchscreen: service and operating.
3. The Touchscreen shall have a protective overlay over the display.
a. The overlay shall reduce wear
b. The overlay shall reduce glare
4. The manufacturer shall provide backboxes for all LCD stations.
a. Flush back box dimensions shall be 7.94” wide x 5.33” high x 3.25” deep
b. Surface back box dimensions shall be 8.3” wide x 5.6” high x 2.55” deep

D. Electrical
1. Touchscreens shall be powered entirely by the System network.
2. Touchscreens shall connect to the System using an Ethernet network with Power over Ethernet (PoE) or the Unison control station Echelon® Link power network.
a. Ethernet Network
1) Ethernet network shall be 10/100BaseTX, auto MDI/MDIX, 802.3af compliant.
2) Network shall utilize Unshielded Twisted Pair (UTP) Category 5 wiring.
b. Echelon® Link power network.

1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
2) Touchscreen stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
3) Network wiring may be bus, loop, home run, star or any combination of these.
4) Network insulation displacement connectors shall be provided with all stations.

E. Functional
1. System
a. The Touchscreen shall support configuration firmware upload from a Paradigm Processor as proxy
b. The Touchscreen shall support configuration or firmware upload from local removable media
2. Setup Mode
a. There shall be a setup display that is separate from any user-defined configuration
b. It shall be possible to view and modify connectivity settings
c. It shall be possible to view status information
d. It shall be possible to view and modify LCD screen settings
e. It shall be possible to perform Touchscreen calibration
f. It shall be possible to view and modify audio settings
g. The appearance of the setup display shall be standard and not editable
h. The setup display may be invoked from within the user-defined configuration and/or physical button on the Touchscreen
i. There shall be a default protected method to invoke the setup display
3. Configurations
a. It shall be possible to have multiple configurations stored within an LCD Station
b. Only one configuration may be active on the LCD Station
c. It shall be possible for Touchscreen Stations connected via the Echelon® Link power network to select a configuration automatically based on the configuration of the physical connection.
d. Where multiple configurations are stored there shall be a boot menu to allow selection of a configuration
e. Each configuration shall be identified as a different Station within the System
4. Operation
a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Touchscreen controls. System shall allow the control of presets, sequences, macros and time clock events.
1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
a) Presets shall have a discrete fade time, programmable from zero to 84,600 seconds with a resolution of one hundred milliseconds.
b) Presets shall be selectable via Touchscreen stations.
2) System macros and sequences shall be programmable via LightDesigner system software.
a) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.

b) Macro and sequences shall be activated by button, time clock event or LightDesigner software.

3) System time clock events shall be programmable via the Touchscreen, LightDesigner system software, the processor user interface, or the internal web server.

a) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.

b) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.

b. Touchscreen stations shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.

1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, and cue light, or room join/separate.

2) Optional fader functions include master control, individual channel control, fade rate control or preset master control.

c. Touchscreen stations shall allow programming of station and component electronic lockout levels via LightDesigner.

d. It shall be possible to adjust LCD contrast and brightness.

e. It shall be possible to program the station to dim during periods of inactivity.

F. Contractor shall provide quantity and style of touchscreens as indicated on the bid documents (permanently installed wall mount, portable or wireless).

2.10 LIGHTING CONTROL SYSTEM CONFIGURATION & CONTROL SOFTWARE: REFERENCED PRODUCT ETC LIGHTDESIGNER

A. System Configuration

1. The Unison Paradigm LightDesigner software program shall be an application software package that facilitates off-line Unison Paradigm control system configuration. LightDesigner shall also enable a computer to be connected on-line with a Unison Paradigm lighting control system for real time preset selection, editing and recording.

a. Software setup shall include Configuration and Space (Room) Wizards, Zone, Preset, Sequence, Station and Wall Properties, Touchscreen Station Setups, Time clock Events and Macros.

b. The software program shall be supplied complete with Operators Manual and software disk.

2. Functions

a. Configuration and Room Wizards

1) The software shall provide easy step-by-step wizards to allow configuration of rooms, channels, walls and control stations.

2) The program shall allow setup of all system parameters including quantity of rooms, dimmers, zones, presets and control stations. System limitations shall be based on system's Unison processor.

3) System program shall support a graphic display of individual rooms, showing zones, presets, control stations and moveable wall placement. Systems with non-graphic displays shall not be acceptable.

4) Software shall support the programming and operation of multi-sectioned rooms with moveable partitions.
5) LightDesigner shall support the programming of station and component electronic security.
6) LightDesigner shall support the transfer of architectural system configurations to processors via Secure Digital (SD) Cards, USB Flash Drives, or Ethernet.

b. Zone, Preset, Station and Wall Properties
1) LightDesigner shall support the configuration of system zone properties. Configurable zone properties shall include zone name, input mode, dimmer to zone patch, and maximum and minimum zone levels.
2) LightDesigner shall support the configuration of system-preset properties. Configurable preset properties shall include preset name and fade time. Presets shall have a discrete fade time, programmable from zero to 86,400 seconds with a resolution of one hundred milliseconds.
3) LightDesigner shall support the custom programming of control station buttons and faders. Button function assignments shall include Preset (last action, pile on, or toggle), Off, Manual, Zone, Record, Raise, Lower, Wall (toggle or direct) Lockout (toggle or direct), No Action, and Macro. Button properties shall include Lockout Level and Legend. Fader assignments shall include Zone, Preset, Master, and Fade time. Fader properties shall include Lockout Level and Legend.
4) LightDesigner shall support the configuration of system wall properties. Configurable wall properties shall include wall name.

c. Time clock Events and Macros
1) LightDesigner software shall support the programming of Astronomical Time Clock (ATC) events for up to ten standard day types and up to 24 custom day types. ATC events include selection of presets or macros. ATC events shall be triggered by sunrise, sunset, time of day and/or periodically.
2) LightDesigner software shall support the programming of multifunction macro sequences. Macros shall be activated via buttons on any Unison station, or via time clock event.

B. Touchscreen Station Configuration
1. The Unison Paradigm Control Designer software program shall be an application software package that facilitates off-line Unison Paradigm Touchscreen station configuration.
a. Software setup shall include Configuration and Design Wizards, to create a graphical representation of a control environment.
b. The software program shall be downloadable from the manufacturer's website free of charge.
2. 2. Functions
a. Touchscreen Setup shall include standard or custom control pages. Standard page types shall include zone, preset, wall, or security.
b. Each page may contain graphic objects including buttons, straight or curved faders, and other graphic controls. Pages may also contain imported bitmap images, pop-up windows, animations, numeric keypads, tabs, and clocks.
c. Object Assignments shall include any Action assignable within the System.

d. It shall be possible to adjust LCD contrast and brightness. It shall also be possible to program the station to dim to any level during periods of inactivity.

2.11 PURE SINE WAVE UNINTERRUPTIBLE POWER SUPPLY WITH SURGE SUPPRESSION AND POWER FILTRATION: REFERENCED PRODUCT MIDDLE ATLANTIC PREMIUM SERIES UPS-1000R/2200R RACKMOUNT UNITERRUPTABLE POWER SUPPLY

A. General

1. Provide the specific model of backup UPS as listed on the contract documents *and* as is needed based upon the plugged equipment power requirements (provide per intended load, regardless of what is shown on contract documents).

B. Specifications

1. Rackmount Uninterruptible Power Supply (UPS) shall be Middle Atlantic Products model # UPS- __ R__ (refer to chart). UPS shall be line interactive with AVR. Unit shall measure 19.00” W x 3.50” H x 19.00” D and occupy 2 rackspaces. UPS shall have a rear mounting range of 19” to 32” and not require more than one person to mount. Unit shall operate on 120 VAC/60Hz current. Unit shall have a nominal output of 120V. Unit shall have a capacity of __ VA and __ W (refer to chart). Unit shall have (8) NEMA 5- __ receptacles on the rear of the unit (refer to chart). Unit shall have a priority outlet bank consisting of 4 outlets dedicated to ensure maximum run time of critical components. Unit shall have a non-critical outlet bank consisting of 4 outlets dedicated to load shedding, or individual outlet control, depending on model. Unit shall be IP enabled, depending on model, or when used with option IP Expansion card, model# UPS-IPCARD. Rackmount UPS shall include a 9’ __ (refer to chart) SignalSAFE™ power cord with NEMA __ (refer to chart) plug. UPS shall have surge suppression that utilizes a clean line-to-neutral design that does not pass noise contamination to ground. Rackmount UPS shall have a hot swappable battery that allows for a __ minute run time at half load and a __ (refer to chart) minute run time at full load. Rear of unit shall have inputs that allow for the installation of up to 10 additional hot swappable batteries. Rackmount UPS shall be RoHS EU Directive 2002/95/ EC compliant. Rackmount UPS shall utilize Middle Atlantic Power Manager™ software. Rackmount UPS shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years; battery shall be warrantied for a period of 2 years. Rackmount UPS shall be UL listed in US and Canada.

C. Features:

1. Pure Sine Wave technology with Automatic Voltage Regulation to improve the quality of power provided to the A/V system
2. Surge suppression utilizes a clean line-to-neutral design that does not pass noise contamination to ground
3. Models with bank control available
4. Individual outlet control available
5. Internet enabled models available, which include: - Real time UPS monitoring via the Web - Remote management and configuration of UPS via Web Browser or NMS (Network Management System) - Auto-shutdown to protect servers/workstations from data loss due to power failure - Schedule shutdown/start-up/reboot of the UPS - Event logging to trace UPS operational history - Data logging for analyzing power conditions - Event notification via email and SNMP traps - Supports TCP/IP, SNMP/HTTP, NTP, DNS, SMTP protocol - MIB (Management Information Base) provided - Quick installation and user friendly interface - User upgradeable firmware via FTP - Security management provided
6. Control system integration via RS-232 and USB and analog I/O

7. Load shedding allows extended run time for system-critical components by disconnecting power to less-critical components
8. Line Interactive Technology
9. Power Manager software allows extensive configuration and event notification capabilities
10. Energy Saver design reduces power consumption by up to 75% when compared with traditional UPS designs
11. 9' SignalSAFE™ power cord minimizes stray magnetic fields
12. UL Listed in the US and Canada

D. Accessories (Provide with all accessories listed on the contract drawings):

1. UPS-IPCARD - Web based control shall be enabled on non-internet enabled Middle Atlantic Products UPS by UPS-IPCARD, which shall be installed into the Expansion Port on the rear of the UPS. This shall be compatible with UPS firmware v1.65 or greater, and provide full functionality when used on models with firmware v1.75 or greater.
2. UPS-RLCARD - Remote shutdown of the UPS shall be enabled on non-internet enabled Middle Atlantic Products UPS by UPS-RLCARD, which shall be installed into the Expansion Port on the rear panel of the UPS. This shall be compatible with UPS firmware v1.65 or greater. A user supplied remote push button and external +12VDC source shall be connected to the DB-9 connector on the UPS-RLCARD to activate the remote shutdown feature.
3. Expansion Battery - Rackmount expansion battery pack shall be Middle Atlantic Products model# UPS-EBPR. Expansion battery pack shall be suitable for use with both UPS-1000R and UPS-2200R. UPS-EBPR shall measure 19.00" W x 3.50" H x 19.29" D and occupy 2 rackspaces. UPS-EBPR shall require 22.66" useable depth. With __ hot swappable batteries connected to the unit, there is a __ minute run time at half load and a __ minute run time at full load (refer to chart). Rackmount expansion battery pack shall be warrantied for a period of 2 years.
4. Replacement Battery - Replacement Battery Pack for the UPS shall be Middle Atlantic Products model # UPS-RBP. Replacement battery pack shall be suitable for use with both UPS-1000R__ and UPS-2200R__. Replacement battery shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 2 years.

E. Technical Specifications:

UPS-1000 Series					
Utility Voltage (AC)	≤ 80	81-105	106-133	133-147	>147
Fans Engaged	front & rear	rear only	none	rear only	front & rear
dBA above Ambient	22dBA	11dBA	0	11dBA	22dBA

UPS-2200 Series					
Utility Voltage (AC)	≤ 80	81-105	106-133	133-147	>147
Fans Engaged	Front & Rear	Rear only	None	Rear Only	Front & Rear
dBA above Ambient	27dBA	14dBA	0	14dBA	27dBA

Model#	Capacity	Outlet Control	Internet enabled
UPS-1000R	1000VA	critical / non-critical bank	w/ optional UPS-IPCARD
UPS-1000R-IP	1000VA	critical / non-critical bank	yes
UPS-1000R-8	1000VA	individual outlet	w/ optional UPS-IPCARD
UPS-1000R-8IP	1000VA	individual outlet	yes
UPS-2200R	2150VA	critical / non-critical bank	w/ optional UPS-IPCARD
UPS-2200R-IP	2150VA	critical / non-critical bank	yes
UPS-2200R-8	2150VA	individual outlet	w/ optional UPS-IPCARD
UPS-2200R-8IP	2150VA	individual outlet	yes

		UPS-1000R Series	UPS-2200R Series
Input	Nominal Input Voltage	120 V	120 V
	Input Voltage Range	80VAC – 145VAC	80VAC – 145VAC
	Input Frequency	60 Hz +/- 3 Hz (auto sensing)	60 Hz +/- 3 Hz (auto sensing)
	Input Protection Type	Resettable thermal fuse	Resettable thermal fuse
	Cord Length / Cord Type / Plug Type	9 ft. / 14/3 / NEMA 5-15P	9 ft. / 12/3 / NEMA 5-20P
Output	Green Mode Consumption	Less than 9W at full battery capacity	Less than 9W at full battery capacity
	Nominal Output Voltage	120 V	120 V
	Capacity (VA)	1000VA	2150VA
	Capacity (Watts)	750W	1650W
	Waveform	Pure Sine Wave	Pure Sine Wave
	On Line Output Frequency	57 - 63 Hz for 60 Hz nominal	57 - 63 Hz for 60 Hz nominal
	On Battery Output Frequency	60 Hz +/- .1 Hz	60 Hz +/- .1 Hz
	Transfer Time (Typical)	4 ms typical line to battery / battery to line	4 ms typical line to battery / battery to line
	Overload Protection (on line mode)	100%≤ Load< 110% warning, 120 sec shutdown 110%≤ Load< 125% warning, 40 sec shutdown 125%≤ Load warning, 10 sec shutdown	100%≤ Load< 110% warning, 120 sec shutdown 110%≤ Load< 125% warning, 40 sec shutdown 125%≤ Load warning, 10 sec shutdown
	Overload Protection (on battery mode)	100%≤ Load< 110% warning, 30 sec shutdown 110%≤ Load< 125% warning, 10 sec shutdown 125%≤ Load warning, 3 sec shutdown	100%≤ Load< 110% warning, 30 sec shutdown 110%≤ Load< 125% warning, 10 sec shutdown 125%≤ Load warning, 3 sec shutdown
Total Harmonic Distortion (THD) *typical 120V power with 2%-4% THD	Total System Load	0% 20%	60% 100%
	Utility Mains* THD	2.0% 2.0%	2.0% 2.0%
	Battery Backup THD	1.9% 1.3%	1.5% 5.2%
Surge Protection & Filtering	Lightning / Surge Protection	L-N=>381 J (127J x 3) Clamp voltage 270V (Max energy 10 / 1000 µs)	L-N=>381 J (127J x 3) Clamp voltage 270V (Max energy 10 / 1000 µs)
	RJ11 / RJ45 Protection	Sidactorx1 Clamp Voltage 275V Fuse (.75A / 250V) x 2	Sidactorx1 Clamp Voltage 275V Fuse (.75A / 250V) x 2
Physical	Output Receptacles	(8) NEMA 5-15R	(8) NEMA 5-20R
	Dimensions (in.)	19.00" [423] W x 3.50" [89] H x 19.29" [490] D	19.00" [423] W x 3.50" [89] H x 19.29" [490] D
	Weight (lb.)	68 lbs.	77 lbs.
Battery	Rating	12V / 9.0 AH x 4	12V / 9.0 AH x 4
	Auto Charger	1A	1A
	Hot Swappable External Battery	Yes	Yes
	Run Time at Half Load	26 minutes	13 minutes
	Run Time at Full Load	13 minutes	6.4 minutes
Warning Diagnostics	Control Panel	LCD Display Indicators, Power On	LCD Display Indicators, Power On
	Audible Alarms	On Battery, Low Battery	On Battery, Low Battery
Environmental	Operating Temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
	Operating Relative Humidity	0 to 95% Non-Condensing	0 to 95% Non-Condensing

		UPS-1000R Series	UPS-2200R Series
Communication	Software	Middle Atlantic Power Manager™	Middle Atlantic Power Manager™
Management	Self-Test	Manual Self-Test via front panel	Manual Self-Test via front panel
	Auto-Charger/ Auto-Restart	yes	yes
	COM Interface	Primary: - RS232 Communication + Control - Analog Status Notification + Control Secondary: - Analog status notification only	Primary: - RS232 Communication + Control - Analog Status Notification + Control Secondary: - Analog status notification only
	Built-in USB Interface	yes	yes

Estimated Run Times UPS-1000R Series								
Load (VA)	120	240	360	480	600	720	840	960
Load (W)*	84	168	252	336	420	504	588	672
Load (A)	1	2	3	4	5	6	7	8
# of expansion batteries	Estimated Run Time (Minutes)							
UPS only	102	51	34	26	20	17	15	13
1	561	283	190	143	114	94	80	69
2	1020	515	345	260	207	171	145	125
3	1479	747	501	377	300	249	211	181
4	1938	979	657	494	394	326	276	238
5	2397	1211	813	611	487	403	341	294
6	2856	1443	968	728	580	480	407	350
7	3315	1676	1124	845	674	557	472	406
8	3774	1908	1280	962	767	635	537	463
9	4233	2140	1435	1079	860	712	603	519
10	4692	2372	1591	1196	954	789	668	575

*Assuming a Power Factor of .7

Estimated Run Times UPS-2200R Series																
Load (VA)	120	240	360	480	600	720	840	960	1080	1200	1320	1440	1560	1680	1800	1920
Load (W)*	90	180	270	360	450	540	630	720	810	900	990	1080	1170	1260	1350	1440
Load (A)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
# of expansion batteries	Estimated Run Time (Minutes)															
UPS only	102	51	34	26	20	17	15	13	11	10	9	9	8	7	7	6
1	561	283	190	143	114	94	80	69	60	53	47	42	37	33	29	26
2	1020	515	345	260	207	171	145	125	109	96	84	75	66	58	51	45
3	1479	747	501	377	300	249	211	181	158	139	122	108	95	84	74	64
4	1938	979	657	494	394	326	276	238	207	181	160	141	124	109	96	84
5	2397	1211	813	611	487	403	341	294	256	224	197	174	153	135	118	103
6	2856	1443	968	728	580	480	407	350	305	267	235	207	182	161	141	122
7	3315	1676	1124	845	674	557	472	406	353	310	272	240	212	186	163	142
8	3774	1908	1280	962	767	635	537	463	402	352	310	273	241	212	185	161
9	4233	2140	1435	1079	860	712	603	519	451	395	348	306	270	237	208	181
10	4692	2372	1591	1196	954	789	668	575	500	438	385	339	299	263	230	200

*Assuming a Power Factor of .75

2.12 PURE SINE WAVE UNINTERRUPTIBLE POWER SUPPLY WITH SURGE SUPPRESSION AND POWER FILTRATION: REFERENCED PRODUCT APC SMART UPS SMT FLOOR MOUNT UNITERRUPTABLE POWER SUPPLY

A. GENERAL

1. Provide the specific model of backup UPS as listed on the contract documents *and* as is needed based upon the plugged equipment power requirements (provide per intended load, regardless of what is shown on contract documents).
2. APC Smart-UPS traditional Tower form factor.
3. PowerChute management software for servers and workstations and advanced UPS management (All major operating systems supported). Connectivity is through serial or USB port (USB not standard on all models). Additional manageability is available through the SmartSlot, an internal accessory slot that allows you to install optional accessories to enhance the performance of your UPS. Network connection with Web browser management and/or environmental monitoring, serial port expansion, and out-of-band management options are available.
4. With pure sine-wave output ensuring compatibility with all connected devices, Intelligent Battery Management ensuring a highly available UPS and an advanced 16 segment bar graph display.

B. TECHNICAL SPECIFICATIONS:

Cable Details	
Form Factor :	External

Dimensions & Weight (Shipping)	
Shipping Depth :	23 in
Shipping Height :	15 in
Shipping Weight :	58.2 lbs
Shipping Width :	13 in

Run Time Details	
Load Type :	Full load
Run Time (Up To) :	7

UPS	
Battery Technology :	Lead acid

Battery	
Enclosure Type :	Internal
Load Type :	At full load
Recharge Time :	3 hours
Run Time (Up To) :	7 min

Cable	
Connectivity Details Length :	6 ft
Connectivity Details Type :	Power cable
Connectivity Details Type :	USB cable

Environmental Parameters	
Humidity Range Operating :	0 – 95%
Max Operating Temperature :	104 °F
Min Operating Temperature :	32 °F
Sound Emission :	45 dBA

Header	
Brand :	APC
Compatibility :	PC
Manufacturer :	APC
Model :	1500VA USB
Packaged Quantity :	1
Product Line :	APC Smart-UPS

Interface Provided	
Connector Type :	25 pin D-Sub (DB-25)
Qty :	1
Type :	Management (RS-232)
Type :	Management (USB)

Miscellaneous	
Color :	Black
Color Category :	Black

Networking	
Remote Management Interface :	RS-232, USB

Power Device	
Form Factor :	External
Frequency Provided :	50/60 Hz
Frequency Required :	50/60 Hz
Input Connector Qty :	1
Input Connector Type :	Power NEMA 5-15
Input Voltage Range :	AC 82 - 144 V
Input Voltage Range (Adjustable) :	AC 75 - 154 V
Output Connector Qty :	8
Power Capacity (VA) :	1440 VA
Power Provided :	1 kW
Surge Suppression :	Yes
UPS Output Waveform :	Sinewave
UPS Technology :	Line interactive
Voltage Provided :	AC 120 V
Voltage Provided Margin :	± 5%
Voltage Required :	AC 120 V

Power Output Connectors Details	
Connector Qty :	8
Connector Type :	Power NEMA 5-15

Power Supply	
Device Energy Rating :	459 Joules

Service	
Support Details Full Contract Period :	2 years
Support Details Type :	Limited warranty

Service & Support	
Type :	2-year warranty

Slot Provided	
Free Qty :	1
Total Qty :	1
Type :	SmartSlot

Dimensions & Weight	
Depth :	17.3 in
Height :	8.5 in
Weight :	53.13 lbs
Width :	6.7 in

General	
Product Type :	UPS
Subcategory :	UPS

C. GENERAL

1. Provide with the APC 3-year warranty.

2.13 SINGLE PORT DMX ETHERNET NODE: REFERENCED PRODUCT PATHWAY CONNECTIVITY PATHPORT UNO

A. General

1. The Pathport Uno shall be a single-port TCP/IP-compliant gateway node to encode, route and decode DMX data over Ethernet.
2. The node shall support the following protocols for DMX-over-Ethernet transport: Pathport, streaming ACN (Net 3), Strand Shownet, ArtNet. The node shall support, as an output device only, ETC Net2.
3. The node shall incorporate one 5-pin XLR connector mounted on the front face. A female connector shall be used on a nominal output node. A male connector shall be used on a nominal input node.
4. The node shall incorporate one female RJ45 connector mounted on the circuit board for connection to standard Ethernet wiring.
5. The node shall operate as a 10MB device.

B. Appearance
1. The node shall be mounted on a mild steel, single-gang Decora-style faceplate and shall fit a standard, deep back box.
2. Finish shall be matte black or stainless steel.
3. The node shall be of pleasing appearance, suitable for high-visibility architectural locations.
4. There shall be two status LED's on the face: one blue LED shall indicate an active network link; one green LED shall indicate active DMX.
5. There shall be an "identify" function available through management software that shall flash the two LED's together at twice their normal brightness.

C. Power
1. The node shall only operate on IEEE 802.3af Power-over-Ethernet, supplied by an IEEE 802.3af compliant Ethernet switch (by others) or in-line power supply.
2. The node's DMX port shall withstand fault voltages of up to 250VAC without damage.

D. Configuration
1. The node shall be available in DMX input and DMX output versions.
2. The node shall be fully and remotely configurable using Pathport Manager software running on a Java-enabled PC or Mac connected to the Ethernet network. Pathport Manager software shall not be required for regular operation of the node. Configuration shall include but not be limited to:
3. Each node shall accept a user-defined name and IP address.
4. Port direction shall be reversible.
5. DMX output refresh rate shall be user-selectable.
6. Each node shall manage up to 128 DMX universes.
7. Custom channel patches shall be possible, allowing the routing of any input universe or channel to any output location in any order.
8. HTP merging and/or signal prioritizing shall be possible of up to eight input channels to create one output channel.
9. DMX-over-Ethernet transmit and receive protocols shall be user-selectable.
10. Each node's configuration, patching and routing shall be stored locally in the node in non-volatile memory. The node shall recover from power interruption without use of configuration software.
11. Multiple nodes on the same network may be remotely configured over the same Ethernet connection.
12. Each node shall incorporate a four-position jumper switch for hard selection of DMX universes one through four.

E. Compliance
1. The Pathport Uno shall be ETL-listed as a conforming low-voltage device.
2. The Pathport Uno shall be compliant with the RoHS directive.
3. The Pathport Uno shall be a conforming CE device.
4. Each node shall be fully compliant with ANSI E1.11 DMX512A and ANSI E1.20 Remote Device Management standards.

2.14 NETWORK DATA DISTRIBUTION DEVICE: REFERENCED PRODUCT ETC NET 3 TWO-PORT GATEWAY

A. General
1. The lighting control gateway shall be a microprocessor-based unit specifically designed to provide DMX-512 control of stage, studio and entertainment lighting systems. The gateway shall permit DMX-512 data to be encoded, routed over Ethernet and decoded back to DMX-512. The unit shall be a Net3 DMX 2-port Gateway as provided by ETC, Inc.

2. Gateways shall communicate over Ethernet directly with at least ETC, Inc.'s entertainment and architectural lighting control products and other Ethernet interfaces.
3. Connections shall be made between gateways, consoles, architectural systems, and PCs over standard Ethernet distribution systems using 10/100BaseT.
4. The unit shall support ESTA ACN and Streaming ACN
5. The unit shall support the ETCNet2 protocol suite.
6. The unit shall be tested to UL standards and labeled ETL Listed.
7. The unit shall be RoHS Compliant (lead-free).
8. The unit shall be CE compliant.
9. The gateway shall have a backlit graphic LCD display for identification (soft-labeling) and status reporting. Labeling shall be user configurable using Gateway Configuration Editor (GCE). Each gateway shall also have power and network activity LED's on both the front and rear of the unit. The LCD display shall show DMX port configuration indication as well as indicate the presence of valid DMX/EDMX signal. Units that do not indicate port configuration (input/output) and valid DMX/EDMX data shall not be allowed.

B. DMX Ports
1. DMX Ports shall comply with the requirements of the USITT DMX512 and ANSI E1.11 DMX512-A standards.
2. The DMX port shall be software-configurable for either input or output.
3. Hardware configuration override setting shall be provided on the gateway.
4. DMX input shall be fully opto-isolated from the gateway electronics.
5. DMX output shall be earth-ground referenced.
6. DMX Port shall be capable of withstanding fault voltages of up to 250VAC without damage.
7. Each port shall incorporate one 5-pin XLR type connector. A DMX Output port shall utilize female connectors and a DMX input port shall utilize male connectors.

C. Processor
1. Each gateway shall have sufficient processing power to manage up to 64,279 DMX universes (32,910,848 DMX addresses).
2. Maximum delay time from input to output shall not be greater than one packet time (approximately 22 msec.).
3. A minimum DMX update rate of 40Hz shall be sustained under all conditions unless specifically configured for a slower rate for the sake of compatibility of older 3rd party DMX devices.

D. Mechanical
1. Wall Mount/Portable gateway
   a. The Wall mount Gateway will be fabricated of .16-gauge steel, finished in fine-texture, scratch-resistant, black powder coat. Suitable enclosures for the gateway shall include 2-gang standard or deep backbox.
   b. The weight of the gateway shall be 2.5 lbs (1.1 kg).

E. Power
1. Power for the gateway shall be provided either over the Category 5 (or better) cable, from 48V IEEE 802.3af compliant Power over Ethernet distribution equipment, or via conventional switches together with isolated in-line power supplies capable of an operating range of 8-28vDC provided by the gateway manufacturer. Power consumption shall not be greater than 5 watts.
2. The gateway electronics shall be electrically isolated from the power supplied over the Cat5 cable.

3. Power may be provided from IEEE 802.3af compliant power-over Ethernet distribution equipment, or by using conventional switches together with isolated in-line power supplies as provided by gateway manufacturer.

F. Configuration
1. Each gateway on the network shall be individually configurable using ETCNet 3 Gateway Configuration Editor, running on a PC connected to the network. The PC shall only be required for configuration, labeling and signal routing, and shall not be required for normal operation of the system.
2. Each DMX gateway shall control up to 512 DMX addresses, within the confines of 64,279 DMX “universes”. The specific DMX data input or output by the gateway shall be freely configurable by the user. Duplicate outputs of DMX lines (DMX splitter) and discrete outputs shall be fully supported.
3. Any number of DMX universes may be configured with any length up to 512 addresses as long as the total does not exceed 32,767. Any range of DMX addresses may be selected for each. Multiple sources may be combined and a priority may be assigned to each source. Each DMX line may have its own start address and offset for ease of use.
4. All relevant routing information shall be stored in non-volatile memory at each gateway. The system shall recover from a power outage without requiring the PC to be online.

G. Network
1. Communications physical layer shall comply with IEEE 802.3i for 10BASE-T, 802.3u for 100BASE-TX and 802.3af for Power over Ethernet specifications.
2. All network cabling shall be Category 5 or better (for 5e and Category 6), conforming to TIA-568A/B, and shall be installed by a qualified network installer.
3. Data transport shall utilize the TCP/IP suite of protocols to transfer the DMX data.
4. ESTA ACN and streaming ACN shall be supported.
5. Switches shall comply with power-over-Ethernet IEEE802.3af, unless a separate in-line power supply is provided.
6. Multiple DMX signal routing patches and multiple facilities shall be specifically supported and limited only by the file storage capacity of the computer with ETC Network Configuration Editor Software installed.
7. Each DMX gateway shall control up to 512 DMX addresses, per port within the confines of up to 64 DMX (32,767 EDMX addresses) “universes” when using EDMX and 64279 “universes” (32, 910,848 DMX addresses) when using Streaming ACN. Any range of DMX addresses may be selected for each. Multiple sources may be combined and a priority may be assigned to each source. Each DMX line may have its own start address and offset for ease of use.
8. Units shall have built in DMX merger on a universe or channel-by-channel basis.
9. Units shall have built in prioritizer on a universe or channel-by-channel basis.

H. Environmental
1. The ambient operating temperature shall be 0° to 40°C (32° to 104°F).
2. The storage temperature shall be -40° to 70°C (-40° to 158°F).
3. The operating humidity shall be 5% - 95% non-condensing.

I. Accessories - Provide the following:
1. Net3 Gateway Configuration Editor (GCE) software

J. System Requirements
1. Provide the quantity and type of gateways required, as scheduled. Gateways and software shall be as manufactured by Electronic Theatre Controls Inc. of Middleton, WI.

2. Provide Ethernet switches and power supplies as scheduled and as shown on drawings.
3. Provide a current generation PC with Windows operating system and a 10/100 Ethernet card.

2.15 POWER DISTRIBUTION EQUIPMENT:

A. General
1. Connectors available are 20A, 50A and 100A grounded stage pin, 20A twist lock and 20A “U” ground (dual rated “T-slot”); other connectors available as specified. Pigtails shall be three-wire type “SOW” rubber jacketed cable sized for the circuit ampacity. Internal wiring shall be sized to circuit ampacity and shall be rated at 125°C.
a. 20 amp cable mount stage pin connectors shall be 12 gauge 4 way indent crimp (with inspection window) type where the wire is inserted and crimped directly in the socket.
2. Terminations shall be at one end using feed through terminals individually labeled with corresponding circuit numbers. 20 amp circuits shall use screwless tension clamp or standard screw-type/barrier strip U-style terminals listed for 20 – 8 gauge wire. 50 amp circuits shall use compression terminals listed for 10 – 1 gauge wire and 100 amp circuits shall use compression terminals listed for 8 – 2/0 gauge wire. Terminals that place a screw directly on the wire are not acceptable.
3. Equipment, except for wall-mounted boxes, shall be supplied with appropriate brackets and hardware for mounting as shown on the drawings. Connector strips shall have brackets on 5’ centers. Brackets shall be 1½” x .188” ASTM A 36 steel and hardware shall be ASTM A307 grade 5.
4. A low voltage distribution system for DMX or Network (or other protocols as specified) shall be available, incorporated in the connector strip, locations and methods to be per print. Connector strips shall have a voltage barrier installed to accommodate these systems. Distributed DMX or Network systems shall use pass through assemblies consisting of a 6” panel with the following: one DMX or Network Output Connector, one DMX or Network Input (Pass Through) connector, one DMX or Network Pass Through (Bypass) Switch, and a label detailing the use of the pass through assembly. The bypass switch shall be used when no DMX or Network devices are present at that location. When activated, the pass through switch shall pass DMX or Network directly through to the next DMX or Network panel on the strip. The pass through switch shall have a mechanical indicator to show the operator that it has or has not been engaged. Low Voltage signals shall enter the connector strip via a strain relief or connector mounted in a separate DMX or Network terminal box at the specified end of the connector strip.
5. Power distribution equipment shall be Underwriter Laboratories (UL) Listed.

B. Connector Strips
1. Connector Strips shall be fabricated from 18 gauge galvanized steel 6.25”H x 3.3”D with length specified in increments of 6” and shipped fully wired in a minimum of 6’0” sections with all splicing hardware included. They shall be finished with fine-textured, scratch-resistant, black powder coat. Circuits shall be labeled on one side of the connector strip with 2” white lettering on black background labels. Pigtails and outlets shall be spaced on 18” centers, or as otherwise specified. Outlets shall be mounted on individual 3” panels and there shall be no external terminal boxes for units with 28 or fewer circuits unless otherwise specified.
a. Connector strip circuit number labeling:
1) Circuits shall be labeled on one side of the connector strip with 2” white lettering on black background labels.

C. Junction Boxes

1. Gridiron Junction Boxes shall be fabricated from 16-gauge cold rolled steel with 14 gauge end panels. They shall be finished with fine-textured, scratch-resistant, black powder coat. For 30 circuits and less they shall be 14”H x 14”W x 4”D and for 31 to 60 circuits they shall be 14”H x 28”W x 4”D. Cover(s) shall be attached with machine screws and Tinnerman retainer nuts. Cover(s) shall be 16-gauge cold rolled steel. Cover(s) shall be hinged and mounting should allow installer to orient the hinged door to open in any direction.

D. Outlet and Pigtail Boxes

1. Outlet and Pigtail Boxes shall be fabricated from 18-gauge cold rolled steel with 16 gauge covers. They shall be finished with fine-textured, scratch-resistant, black powder coat. Circuit numbers shall be 2” or ¾” labels with white letters on black background (sized to match product). Pigtails and outlets shall be spaced on 3” centers, or as otherwise specified.

E. NEMA Wall Plates

1. An alternative to surface and recessed outlet boxes, ETC’s NEMA style wall plates shall be available for 20A Stage Pin, Edison and Twist-Lock connectors. For use with industry-standard back boxes, the wall plates shall be fabricated of .125 AL and shall be finished with fine-textured, scratch-resistant, black powder coat. Circuit numbers shall be 2” or ¾” labels with white letters on black background (sized to match product).

F. Floor Pockets

1. The floor pocket shall be a wiring device designed for flush mount installation in the stage floor. The floor pocket cover plate shall be constructed of 3/8” cast iron with a non-skid tread pattern and four (4) recessed mounting holes. The cover shall be constructed with integral hinges and four (4) cable notches. Secured to the cover plate shall be an angled sheet-steel mounting panel for receptacles. The floor pocket back box shall have provisions for an integral voltage barrier for low voltage circuits. Circuit designations shall be white on black background labels. The floor pocket cover plate, back box and connector-mounting panel shall be finished in a low gloss black finish. The back box shall be constructed of 16-gauge cold rolled steel and UL listed for use in the United States and Canada.

2.16 WIRING DEVICES (DISTRIBUTION EQUIPMENT): SEE DRAWINGS FOR DETAILS

A. Wiring devices shall be fabricated from 16 gauge cold rolled steel, in 6' 0" sections as required. Devices shall be properly cleaned, primed and painted with fine-textured, scratch resistant, black powder coat. Circuit numbers shall be 3/4” Lexan tags with white letters on black background.

B. Individual pigtails and outlets shall be evenly spaced, on 12" centers in connector strips, or as otherwise specified. Where a circuit would fall on a joint it shall be moved 3" towards the junction box end of the strip.

C. All connectors shall be flush mount 20 Amp 2P&G unless otherwise noted.

D. Devices except for wall-mounted boxes shall be supplied with appropriate hardware for mounting as shown on the drawings. Connector strips shall have brackets on 5' centers. Connector strips shall have a terminal block on one end as shown on the drawings.

E. Wiring devices shall be UL Laboratories Listed.

2.17 CONVECTION COOLED WHITE LIGHT LED RETROFIT REPLACEMENT ENGINE: REFERENCED PRODUCT RLED THE RETRO 500 PASSIVE

A. General

1. The LED Retrofit lamp replacement engine is a high intensity LED illuminator with forward phase, reverse phase or sinewave dimming. The lamp replacement LED engine shall be manufactured by RLED LLC, or Equal.
2. All LED Lamp replacement engines shall be provided by a single manufacturer to ensure dimming curve compatibility.
3. The fixture shall be UL/CSA recognized for LED lamps and Retrofit applications.
4. The fixture shall be compatible with forward, reverse phase or sinewave, 2 wire dimmers, allowing the unit to be dimmed smoothly from 0-100%.
5. Unit shall be able to hold any light level in the dimming curve without flicker or decay of intensity.
6. Provide all upgrades and existing fixture modifications/additions and accessories/stem extensions, junction boxes, sockets, etc. as required in order to incorporate these new RLED replacement fixtures into the existing and to remain fixture housings.

B. Physical

1. The unit shall be constructed of sheet and extruded aluminum, free of burs and pits.
2. The unit shall be 9 7/8” tall and 5 ¼” in diameter and shall weigh 3 lbs. 4.8 oz. with the reflector.
3. The following shall be provided:
   a. Reflector shall be secured by plastic retaining ring that also holds in place the COB LED Chip.
   b. Unit shall use a heatsink and fan arrangement to allow active cooling of the LED array.
   c. Heatsink and fan assembly shall be attached by a series of aluminum brackets that will attach to the bottom of the LED Driver Aluminum casing.
   d. LED Driver shall be housed in a vented aluminum casing, allowing the fan from the LED heatsink below to pull air over the case in order to optimize the life of the electronics.
   e. LED Driver case shall allow for mounting holes for an Edison Medium Screwbase or E11 Mini Candelabra
   f. Reflectors shall be easily interchangeable via a tool-less design.
   g. LED will be a single COB chip, mounted on an aluminum board which is thermally bound to the heatsink via thermal paste. Multiple point source LED Fixtures will not be accepted.
   h. Unit shall have multiple points of attachment for customized retrofit options, but are not limited to PAR 46, PAR 56, PAR 64, E26 Medium Screwbase, bare ends, E11 Mini Candelabra, etc.
4. The LED Engine shall comprise have integrated optics, electronics and heatsink in a single source package, allowing the end user to be able to service the LED components easily and efficiently.
5. The LED driver shall be able to be dimmed on most forward, reverse phase or sinewave dimmers.
6. The Unit shall ship with:
   a. LED COB mounted to Heatsink
   b. Heatsink mounted to LED Driver casing
   c. Either Bare ends of medium screwbase male connector to tie into the existing lamp housing.
7. Available options shall include:
   a. Mini Candelabra lamp base (E11) 1-4” tall adaptable stem
   b. Bare End Wires w/ PAR 56, PAR 64 or Custom Method of attachment
   c. Medium Screwbase (E26)
   d. Mogul Screwbase (E39)
   e. Par 56 adapter Ring

f. Par 64 adapter Ring
g. BA15D Double Bayonet Socket

C. Optical

1. The light output shall be a emulating a single point source.
2. The unit shall be provided with a native 120 Degree Beam Angle with the option of the following optical attachments:
   a. 15 Degree
   b. 23 Degree
   c. 46 Degree
   d. 26 Degree (Low Profile)
   e. 40 Degree (Low Profile)
   f. 59 Degree (Low Profile)
   g. 70 Degree (Low Profile)
   h. 120 Degree (no reflector)

D. Environmental and Agency Compliance

1. The LED retrofit shall be UL/CSA OR UL RECOGNIZED LISTED, and shall be so labeled when delivered to the job site.
2. The LED Retrofit shall be CSA/ UL Listed to UL1598C and UL8750 standard for LED retrofit use.
3. The fixture shall be rated for IP-20 dry location use.
4. LED Retrofit shall be either DLC or Energy Star Listed.

E. Thermal

1. Unless specifically indicated on the contract drawings, provide the passive, convection cooled version of these fixtures.
2. LED Retrofit shall be equipped with a cooling fan (fan cooled version).
   a. Fan output on driver board shall be able to output 12vdc at max of 300ma.
   b. Standard cooling fan shall be installed and shall not exceed 21 decibels at 1 meter distance.
   c. Optional higher cfm fan shall be available with an ambient noise of 37 decibels at a 1-meter distance.
3. LED Retrofit fan shall dim linearly with the output of the light as the dimmer increases in voltage to the LED Dimmable retrofit.
4. The LED retrofit shall have the ability to be installed into a plenum rated fixture, with only the front of the fixture exposed for max light output as well as air ventilation, and shall have a maximum of 2% light loss over 24 hours due to droop.
5. Case temperature of the LED Driver shall not reach beyond 30 Degrees Celcius in a plenum rated can at an ambient room temperature of 25 Degrees Celcius.
6. LED Driver case shall be constructed with a thermistor in order to provide an over temp protection in the case of a fan failure of sudden increase of ambient room temperature. In cases like this, the LED Electronics shall reduce forward current to LED or in extreme cases, shut off driver all together.
7. LED Retrofits that do not have a thermistor or fan cooling, shall not be acceptable.

F. Electrical

1. The fixture shall be equipped with a transformer that can accept 110V to 120V AC.
2. LED retrofit shall have optional 277VAC or 220/240VAC inputs as well.
3. The LED Retrofit can receive its power either from a forward/reverse phase circuit of from a constant hot circuit.
4. LED Driver shall have a THD higher than 90%.

G. LED Array

1. LED array shall be able to produce more than 6000 Lumens in a 22.5mm diameter package, while not exceeding 49 Watts of power consumption.
2. LED array shall be provided from Citizen Electronics
3. LED array shall be offered in the following color temperatures:
   a. 2700K
   b. 3000K
   c. 3500K
   d. 4000K
   e. 5000K
4. LED array shall be offered in the following CRI:
   a. 80 CRI
   b. 90 CRI
   c. 97 CRI
5. LED COB (Chip On Board) array shall be sorted using the 3 Step Macadam System.

H. Calibration

1. LED Retrofit shall be tested on a continuous dimming cycle of 20 Seconds fade up, hold for 5 Seconds, and 20 Seconds fade out, hold for 5 Seconds. This is to ensure consistent dimming across multiple fixtures plugged into the same circuit as well as testing for any immediate product failure.
2. LED Retrofit shall be inspected to ensure that all LED emitters in COB array are lit and that no damage has been done in manufacturing process.

I. Color

1. The LED Retrofit shall have 1 COB LED Array in order to simulate a single point source light source.

J. Maintenance and Service

1. LED retrofit shall have all serviceable parts.
2. LED Driver shall not be contained inside “Potting material” or no serviceable case. LED Retrofits that have no serviceable/non socketed driver will not be accepted.

K. Dimming Performance

1. LED Retrofit shall dim smoothly on a standard forward/ reverse phase dimmer.
2. LED Driver shall use CCR (Constant Current Reduction) as the method of dimming the LED. Any LED Driver using PWM as the method of output to dim the LED array will not be accepted.
3. LED Retrofit shall have the ability of dimming smoothly all the way to 0% without a bottom end cut off or POP off.
4. Any LED driver not being able to meet the above criteria shall not be acceptable.
5. Any substituted manufacturers must provide 5 existing installations, demonstrating all units in the auditorium perform from 0-100% while dimming.

L. Accessories

1. Provide the following accessories as required per location and project and in quantities as indicated. Provide all spares, attic stock, etc. as indicated.
   a. Par46 ring
   b. Par56 ring
   c. Par64 ring
   d. Diffuser
   e. Exx socket extender
   f. Mogul adapter

g. Adjustable Par ring
h. Goof ring (custom patterns available)

M. Warranty

a. Provide with warranty period as indicated on contract drawings. 3 year standard warranty plus additional years up to 6 total.

2.18 WIRE STANDARDS: ALL WIRE IN OR OUT OF CONDUIT WILL BE TYPE CL2-CL3 UNLESS OTHERWISE REQUIRED BY NEC AND JOB SITE CONDITIONS. PORTABLE CABLE EXCLUDED.

A. WIRE – PORTABLE CONTROL CABLES (those cables for use with DMX512-A and USITT DMX512/1990 Systems):

1. The data transmission rate (250 kbits/s) used by DMX512 requires the selection of a portable DMX512 cable that does not significantly distort the signal or give rise to spurious signal reflections. Cables intended for use with audio systems (such as microphone cables), while having the convenience of flexibility, availability and relative low cost, may not be suitable for use with DMX512 because of their high capacitance and incorrect characteristic impedance; at DMX512 data rates this will give rise to bit time distortion and signal reflections/overshoot.
2. Maximum and minimum cable lengths
   a. Maximum and minimum run lengths are specifically omitted due to a number of factors, including signal quality, device operating characteristics including capacitive values, and installation environment. Maximum distance runs without repeaters, therefore, shall be determined by standard industry practices of approx. 330 feet. Regardless of the overall run lengths, the system shall run properly, reliably and without errors, glitches, etc. due to improper use of installed/portable cabling or connectors, terminations, etc.
3. Construction
   a. Portable DMX512 cables shall use twisted pair conductors. Conductors shall be of stranded construction. The raw cable used for a DMX512 cable assembly shall be declared by its manufacturer as suitable for use with EIA-422/EIA-485/EIA-485-A systems. Shielding shall be on individual pairs or overall shielding of pairs or both. The portable cable itself shall be flexible and rugged enough for the repeated coiling and uncoiling to which it will be subjected.
      1) Cables implementing only the Primary Data Link shall consist of at least one twisted pair and be marked according to ANSI E1.27-1, Clause 7.1.
      2) Cables implementing both Data Links shall consist of at least two twisted pairs and be marked according to ANSI E1.27-1, Clause 7.1.
      3) Cables implementing only the Secondary Data Link shall not be allowed.
4. Impedance
   a. Portable DMX512 cables shall have a characteristic impedance in the range 100 to 120 ohms. Due to the characteristic impedance of 120 ohms in EIA-485 systems, 120 ohms is preferred.
5. Capacitance
   a. Capacitance between conductors within a shield shall not exceed 19.8 pF/ft (65 pF/m). Capacitance between any conductor and the shield shall not exceed 35 pF/ft (115 pF/m).
6. Dielectric Withstanding Protection

a. Dielectric rating for portable DMX512 cables shall conform to prevailing electrical codes.

7. Connection Methods - Required Connector
   a. Portable cables shall use 5-pin XLR connectors. The physical pin designations of the 5-pin XLR shall be in accordance with Table 1 (see below).
   b. Any use of alternate connectors shall comply with ANSI E1.11.
8. Electrical Specifications and Physical Layer
   a. General
      1) The physical layer of a DMX512 data link is constrained by earth grounding practices, termination methods, signal levels, EMI, and accidental damage by connection to other devices. Where a conflict exists, DMX512-A shall govern.
   b. DMX512 Portable Cables
      1) General
         a) A DMX512 Portable Cable is a digital data transmission cable designed for the provisional interconnection of two DMX512 devices. Portable cables shall each have two prescribed connectors, a male 5-pin XLR at the end nearest the transmitting device and a female 5-pin XLR at the end nearest the receiving device. Pins shall be designated 1 through 5. There shall be no connection to the shell.
9. Data link common and grounding topologies
   a. In all cases Pin 1 of DMX512 portable cable connectors shall act as Data Link Common. The wire connected to Pin 1 shall be no smaller than the wire used for the twisted pairs in the cable.
10. Each data link shall consist of a separate twisted pair.
11. Terminations
   a. All DMX cabling shall be terminated per applicable standards and so that all devices in any given data run work properly. Use DMX terminators where and as needed and recommended by equipment manufacturers.
   b. 5-Pin XLR Cabling:

Table 1 – Signal Designations Summary		
Use	5-Pin XLR Pin	DMX512 Function
Common Reference	1	Data Link Common
Primary Data Link	2	Data 1-
	3	Data 1+
Secondary Data Link	4	Data 2-
	5	Data 2+

   c. CAT5 Pinout DMX Cabling: *

Wire Color & #	Function	Equivalent XLR Pin #
1 (White/Orange)	Data + (pair 1 true)	3
2 (Orange)	Data – (pair 1 complement)	2
3 (White/Green)	Optional Data + (pair 2)	5
6 (Green)	Optional Data – (pair 2)	4
4 (Blue)	Unassigned	--
5 (White/Blue)	Unassigned	--
7 (White/Brown)	Common for pair 1	1
8 (Brown)	Common for pair 2	1

* The above table is shows the ANSI E1.27-2 standard DMX pinout when using Category 5 (or higher) wire and an RJ45 connector.

The above table is intended for DMX512 cabling only - **NOT** DMX-over-Ethernet cabling. Great care must be taken to prevent the accidental connection of DMX equipment to non-DMX equipment. The connection of DMX equipment to non-DMX equipment such as Ethernet switches or telephone equipment may result in serious equipment damage and/or personal injury, as pins 4 and 5 may carry voltages of up to 48VDC or greater.
Category wire is not recommended for loose or temporary cabling. The use of RJ45 connectors for DMX equipment should be restricted to patch bays in access controlled rooms and should not be used for the direct connection of portable equipment.
Please be aware that some non-standard pin-outs are also in use (i.e. Color Kinetics, etc.) and that custom cabling, connectorizations, etc. may be required in order to interface non-standard pin-outs with the specified system.

2.19 RACKS AND HARDWARE

A. SWING OUT WALL RACK: DWR

1. EIA compliant 19” wall mount rack shall be Middle Atlantic Products model # DWR-__-__ (refer to chart). Overall dimensions shall be 23.4” W x __” H x __” D (refer to chart). Weight capacity shall be __ lbs. Tool-Free Quick-Mount™ system enables one-person installation. Useable depth shall be __” (refer to chart) and shall extend into the back pan 3.5”. Center section and back pan shall be 16-gauge steel, phosphate pre-treated and finished in a black textured powder coat. Rackrail shall be constructed of 11-gauge steel with tapped 10-32 mounting holes in universal EIA spacing with black e-coat finish and marked rack spaces. Rack shall be constructed to swing open for component cabling access, center section shall pivot for either left or right opening. Rack shall have a rear knockout panel with 1/2”, 3/4”, 1”, 1-1/2”, 2” and 3” electrical knockouts installed in base, and a rear knockout panel with 1/2”, 3/4”, 1”, 1-1/2”, 2” and 3” electrical knockouts, four Decora® cutouts, and BNC knockouts for UHF/VHF antennas installed in top. Large laser knockout on back pan shall have a 12-1/2” x 12-1/2” cutout for electrical pull-box. Fan knockouts on top and bottom shall allow for installation of up to four 4-1/2” fans. Rack shall have 2” knockouts, 4” knockouts for Wiremold 4000® Series raceways, and knockouts for UCP Series universal connector panels on the side. Top, bottom and sides shall feature vertical vent pattern. DWR Series enclosures shall satisfy the 2007 & 2010 CBC; 2006, 2009 & 2012 IBC; ASCE 7-05 (2005 Edition) & ASCE 7-10 (2010 Edition) and the 2006 & 2009 editions of NFPA 5000 for use in areas of high seismicity, Seismic Use Group III, Zone 4 or Seismic Design Category (SDC) “D” with lateral force requirements for protecting 140 lbs. of essential equipment in locations with the highest level of seismicity and top floor or rooftop installations with an Importance factor (Ip) of 1.5 when used with DWRSR-ZL Latch. Rack shall be UL Listed in the US and Canada to the UL-2416 (NWIN) Category when used with optional bonding kit, model # PET-K-__. DWR Series shall meet all enclosure requirements towards PCI DSS (Payment Card Industry Data Security Standard) Compliance. Rack shall be GREENGUARD Gold Certified. Rack shall comply with the requirements RoHS EU Directive 2002 / 95 / EC. Rack shall be manufactured by an ISO 9001 and ISO 14001 registered company. Rack shall be warrantied to be free from defects in materials or workmanship under normal use and conditions for the lifetime of the rack.
2. Options
    a. Front doors shall be reinforced 16-gauge steel, model # FD-XX (solid), VFD-XX (vented, 25% open area), LVFD-XX (vented, 64% open area), PFD-XX (plexi), (XX= # of rackspaces of DWR rack)
    b. Keyless Latch replaces keylock, fits front & rear doors, shall be models # LATCH

c. Rear rail kit 11-gauge, 10-32 threaded, sold in pairs, hardware included, shall be model # DWR-RRXX
d. Fan kits with two 4-1/2" exhaust fans, fan guards and vent blockers, shall be model # DWR-FK17 (fits DWR-xx-17), DWR-FK22 (fits DWR-xx-22), DWR-FK26 (fits DWR-xx-26), DWR-FK32 (fits DWR-xx-32)
e. Vent Blockers used to promote active thermal management, shall be model # VBK-D17 (fits DWR-XX-17), VBK-SD22 (fits DWR-XX-22), VBK-E20 (fits DWR-XX-26)
f. Optional cover plate / shelf kit shall be model # DWR-CVR • Minimum-clearance latch shall allow side-by-side or corner mounting, shall be model # DWRSR-ZL
g. Optional bonding kit for UL-2416 (NWIN) compliance shall be Middle Atlantic Products PET-K-D/EWR (for backpan to center section), PET-K-D/EWRD (for backpan to center section to front door), PET-K-FD (for front door to center section)

B. RACK DRAWERS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO D SERIES.
1. Provide ONE rack drawer for each CR rack. Locate system as-built drawings and manuals inside this drawer.
2. EIA compliant 19" rackmount drawer shall be Middle Atlantic Products model # DX or TDX (X = # of rackspaces required, refer to chart). Drawer shall have an overall height of __" (refer to chart), and useable depth of 14-1/2". Drawer base shall be 20-gauge steel, top and sides shall be 16-gauge steel. Drawer faceplate shall be .090" thick aluminum with a __ (black brushed & anodized or black textured powder coat) finish (refer to chart). Drawer shall use full extension, ball bearing slides. Grommet shall be provided for safely passing cables through the cable entry point at the rear of the drawer on 2, 3 and 4 space models. 2, 3 and 4 space drawers shall include a no-slip drawer mat. Drawer shall have a 50 lb. weight capacity.
3. Drawer shall be warrantied to be free from defects in materials or workmanship under normal use and conditions for a period of three years. Drawer shall be UL Listed in the US and Canada.
4. Drawer shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. Drawer shall be RoHS EU Directive 2002/95/EC compliant. Drawer shall be manufactured by an ISO 9001 and ISO 14001 registered company.

C. POWERCOOL

1. EIA compliant 19” PowerCool™ Rackmount power distribution and cooling unit shall be Middle Atlantic Products model # PD-COOL-__(refer to chart), with a __ (15, 20 refer to chart) amp capacity, 2 stage, normal mode (Line to Neutral) spike and surge suppression with dry contact and LED status indicators and EMI filtering. PowerCool shall activate at 87°F (30.5°C), reach full speed at 95°F (35°C) and switch off at 85°F (29.4°C). PowerCool shall displace 50 CFM with a maximum decibel level of 29 dB (measurements made 1 meter from source, centered horizontally and vertically). PowerCool shall operate at a static pressure of .031 in. H20. PowerCool shall have a removable 10” temperature probe. PowerCool shall have a normally open contact closure for remote surge suppression status notification to customer supplied monitoring device shall operate on 120 volt AC/60Hz nominal power. PowerCool shall have a removable 6’ __A (14-3) IEC SignalSAFE™ power cord with IEC C-(14 or 20) receptacle (refer to chart). PowerCool shall have __(0,1) front and 10 NEMA 5-__R outlets, and (circuit breaker switch with switch guard, keyswitch, always on, refer to chart) located on the front of the unit. “Clean ground” surge suppressor design shall not pass noise contamination to the ground. PowerCool shall occupy one rackspace with a (flat black, black brushed and anodized finish, refer to chart). PowerCool shall comply with the requirements of RoHS EU Directive 2002/95/EC. PowerCool shall be manufactured by an ISO 9001 registered company. PowerCool shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years. PowerCool shall be ETL listed to UL standard 1419 in the US and CAN/CSA C22.2 #60065 in Canada.

D. MODULAR POWER RACEWAYS: REFERENCED PRODUCT MIDDLE ATLANTIC MPR RACEWAYS. SEE DRAWINGS FOR CIRCUIT QUANTITIES AND CONFIGURATION.
   1. MPR modular raceways shall be Middle Atlantic Products model # MPR-6. Power modules shall be M-20. Isolated ground outlets shall be available, suffix part with IG (ex. RLM-20IG). Stand-alone power modules shall be RLM-xx-1C and shall include a 9’ power cord with NEMA 5-15P plug or 5-20P plug. MPR components shall be warrantied to be free from defects in material and workmanship under normal use and conditions for a period of 3 years. MPR components shall be UL Listed separately and as a system in the US and Canada.
      a. Modules on the same circuit shall interconnect using J series jumpers, which feature #12 (20 amp) wire with genderless 30 amp connectors at both ends and require no hard wiring.
      b. All modules on separate circuits shall connect using T series tails, which feature #12 (20 amp) wire with genderless appliance-grade 30 amp connector on one end and wire tails for J-box connection on the other.
      c. Two separate circuits can feed two duplexes on M-2X modules. Remove the factory-installed jumpers (line & neutral) and feed each duplex using two T series tails.
      d. Isolated ground outlets shall not be mixed with non-isolated ground modules on the same circuit.
      e. Module chassis shall be constructed of 18-gauge steel finish in a durable black powdercoat.
      f. The modules shall be attached to MPR raceways using two conveniently located screws.

E. BLANK PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO BL SERIES.
   1. EIA compliant 19” blank panels shall have a black powdercoat finish. Blank panels shall be constructed of 16-gauge aluminum.

F. VENT PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO VT SERIES.
   1. EIA compliant 19” vent panels. Vent panel shall be constructed of 16-gauge aluminum and shall have a black powder coat finish.

a. VT perforation pattern shall be: 5/32” dia. hole, with 3/16” staggered centers. Open Area 63%

G. RACK DRAWERS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO D SERIES.

1. EIA compliant 19” rackmount drawer shall have an overall height of X”, and useable depth of 14-1/2”. Drawer base shall be 20-gauge steel, top and sides shall be 16-gauge steel. Drawer faceplate shall be .090” thick aluminum with a black brushed & anodized finish. Drawer shall use full extension, ball bearing slides. Laser knockout shall be provided for passing cables through the rear of the drawer. Drawer shall be UL Listed in the US and Canada. Provide all drawers with keylock option.

2.20 LED RACK WORK LIGHT: REFERENCED PRODUCT MIDDLE ATLANTIC LT SERIES

A. Features:

1. LT series shall have an adjustable width of 17.73” to 21”, a height of 1.75” and a depth of 1.72”.

2. LT series shall have a light temperature of 2,700-6,500K, and provide __lm (refer to chart).

	Light Qty	Interconnect Cable / Length	Light Temperature	Lumens
LT-CABUTL-SINGLE	1	no	2700-6500K	480-540lm
LT-CABUTL-DUAL	2	yes / 118 [3000]	2700-6500K	960-1080lm

3. LT series light bar shall have an adjustment range of 100º. LT series shall have a cord length of 59”, and the interconnect cable (LT-CABUTL-DUAL only) shall be 118”.

4. LT Series shall include power adaptors for US, BS, SAA and EU. LT Series shall have a UL Listed power supply that meets US DOE Level VI requirements with an output of 12VDC, 2 Amps.

5. LT Series shall have an input voltage range of 90VAC to 260VAC, an input frequency range of 50/60Hz, and a max AC current draw of 800mA AC.

6. LT Series shall meet the EU RoHS Directive 2011/65/EU. LT Series shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years.

7. LT Series shall be CE Marked (single light only) and FCC Part 15, Class B.

B. Technical Specifications:

TECHNICAL SPECIFICATIONS	LT-CABUTL-SINGLE	LT-CABUTL-DUAL
INPUT (AC/DC ADAPTER)		
Input Voltage Range	90VAC - 260VAC	
Input Frequency Range	50/60Hz	
Max AC Current Draw @ Full Load	800mA AC	
OUTPUT (AC/DC adapter)		
Nominal DC Output Voltage	12VDC	
DC Output Voltage Range	11.4VDC - 12.6VDC	
Typical DC Current Draw	Single Light 0.6ADC, Dual Light 1.2ADC	
Max DC Load Current	2.0ADC	
Short Circuit Protection	Yes	
DC Output Connector	3.5mm x 1.35mm x 12mm, Center Positive	
PHYSICAL (AC/DC adapter)		
Dimensions	1.8 x 3.5 x 1.5 in (45.5mm x 88mm x 38mm)	
AC Receptacles	Four (4) Interchangeable: US, BS, SAA, EU	
Weight Lb. (G)	0.39lb (175g)	
REGULATORY(AC/DC adapter)		
Safety	UL, cUL, CE	UL, cUL
EMI (Adapter and Lights)	FCC Class B, CE	FCC Class B
Efficiency	Meets US DOE Level VI requirements	
ENVIRONMENTAL (lights and AC/DC adapter)		
Operating Temperature	32F TO 104F (0C TO 40C)	
OPERATING RELATIVE		
Humidity	0 TO 90% NON-CONDENSING	

2.21 BILL OF MATERIALS

A. Dimming system equipment is ETR and will be modified as indicated.

B. Relay system equipment and all accessories and controls - see drawings for equipment, quantities and required coordination.

C. Lighting fixtures: See drawings for quantities, types, lamps, locations, installation requirements, etc.

D. Furnish extra (spare) fixtures for each type of house retrofit kit lighting fixture provided; set up and addressed for use (seamless replacement fixtures). See the contract drawings for a detailed summary of quantity of extra fixtures to provide (if not indicated, then provide a 10% minimum for spares for each different type). Store all spare fixtures as per the owner's instructions in their original manufacturer provided packaging.

PART 3 EXECUTION

3.01 GENERAL:

A. All liability for rigging, fastening, wiring and other installation methods shall be borne by the contractor alone. If the contractor has a reason to believe that safety will be compromised in the installation of any specified equipment in the locations specified, they must note this at the time of bid and offer alternatives in writing.

B. Assess life safety implications of all installation methods and verify there is no compromise of life safety issues.

C. Any dangerous work areas must be marked or roped off in a manner that will inform all persons as to potential danger, regardless of that person's sensory handicaps.

D. Maintain M.S.D.S. for all materials used where applicable and submit same if requested upon completion.

E. Maintain the integrity of all fire-walls and doors during construction and upon completion.

F. Take all precautions necessary to guard against electromagnetic interference, electrostatic hum and RF interference, especially into the audio and video systems.

G. The contractor shall supply adequate ventilation and will install all equipment for the maximum safety of the operator.

H. The contractor shall verify all on site dimensions prior to the ordering or installation of critically dimensioned equipment and wiring. In a case of discrepancy between these documents and attached drawings, construction documents and actual on-site dimensions, the contractor will notify the owner and consultant in writing before making any changes in intended work. The owner and consultant will determine the correct modification to the work that needs to be done

I. All methods must be cosmetically acceptable to the owner. All equipment shall be installed neatly, with respect to level & plumb, sight lines and finish. All wiring must be neatly run and concealed in an orderly fashion and attached to appropriate support structures.

J. Identify any equipment requiring licensing and initiate licensing procedures for all such equipment.

K. Coordinate all work with other on-site trades in order to achieve a coordinated progress at all times.

L. All RDM fixtures (remote device management) shall incorporate the latest RDM standard in fixture addressing, remote management, reporting, etc. (must be ANSI E1.37.2 or later compliant).

3.02 WIRING AND RACKS:

A. All CR (communications rack) wiring shall be neatly tie wrap bundled (or as indicated otherwise on contract drawings) with wires parallel and perpendicular to rack sides and backs All wiring shall be properly strain relieved as it exits the rear connection points on the related equipment, shall be routed out to lacing bars, shall be routed out along lacing bars to rack side areas and shall be tie wrapped to the lacing bars. All rack wiring shall be performed as noted. Loose, haphazard or otherwise poorly managed wiring without proper strain relief shall not be allowed.

B. Provide all internal network/DMX style wiring, etc. Needed inside the relay panel & all required interconnections & feeds to external equipment.

C. Control hookup is provided by the factory technician.

D. Within the dimmer/relay rack all wiring splices must utilize butt style line insulated splices crimped with a controlled cycle termination tool. Referenced style Panduit BSV10X-D or equal. Size splices per gauges of wiring to be spliced. See written specifications for more info.

E. All wiring that is not in conduit shall be plenum rated wiring (Belden 1585A or equal).

F. All control booth wiring shall be neatly tie wrap bundled and dressed neatly.

G. All lighting or power cables & wiring must be dressed neatly with tie wraps & eyes or ring runs & tucked up against underside of lighting countertop

H. No undue stress shall be placed on any connection by a lack of support of the wiring within the rack.

I. Any wiring splices necessary must utilize butt style inline insulated splices crimped with a properly adjusted controlled cycle termination tool. Referenced style Panduit BSV10X-D or equal. Size splices per gauges of wiring to be spliced & provide as required. No incorrectly sized splices shall be allowed.

J. Any equipment having accessible controls that are not normally used during system operation will have its controls capped or otherwise locked such that they are not adjustable. If no other means is feasible the use of security covers is mandated. Rack doors are not acceptable as means of tamper resistance for controls.

K. Provide all (rack panels, bottom/top pans, spreader bars, access panels, etc.) blank and/or vent panels as needed to complete each rack with no unfilled spaces, as per rack elevations or as required by alternates to equipment specified. No racks with unfilled panel spaces shall be allowed. Seal all air gaps around conduit entry holes as needed in order to keep air gaps to a minimum.

L. Wiring Standards - Plenum Rated Cable: Unless specifically noted on the drawings, all low voltage wiring is to be CL2/CL3 wiring.

M. No rack rails will be allowed for equipment mounting in the rear of the rack unless otherwise noted in this specification.

N. All conduits indicated on the drawings shall terminate directly into racks as shown – top, bottom or at any of the provided knockout locations (unless otherwise and specifically indicated on the drawings as otherwise) and so as not to obstruct access to the racks or adjacent walkways or approaches.

O. Route conduits into racks with as few bends as possible – use sweep elbows where necessaryAll wiring shall be protected in conduit until it has reached the internal space of the indicated rack(s).

P. All dimming/lighting system related racks shall be mounted vertically and as intended by the manufacturers. No racks shall be allowed to be mounted horizontally.

Q. The contractor shall program the main dimmer rack(s) control module(s) to “hold last look” upon loss of DMX signal. Duration of this hold shall be for 15 minutes (unless the system has been shut down or turned off by the architectural control system). This shall prevent the room from going dark in the case of lighting console failure or inadvertent disconnection of DMX/NET input from lighting control console to the system.

R. ELECTRICAL & GROUNDING:

1. Grounding of shields and chassis will adhere to industry standard practice and as required by the dimming & control systems manufacturer.

2. Verify that all hot, neutral and ground conductors are tightened at least 5 days after initial installation and landing of line & load conductors.

3. Any AC service shall be installed to standard Edison U-Ground style outlets at the locations noted on the electrical drawings. Where racks are located the service is to be run to the interior of the rack. Two U-ground outlets will be available for each 20-amp, single-phase circuit unless otherwise indicated or terminated into MPR style devices.

4. Internal rack AC distribution is the responsibility of the contractor. Acceptable methods: Rack mount power strips, rack mounted power distribution devices, Wiremold style outlet strip.

5. Install all internal AC rack power with all switches and controls carrying hazardous voltage housed in steel enclosures within the rack. Provide positive electrical grounding for all steel enclosures. All AC service will incorporate separate hot, neutral and ground for each device. All grounds and neutrals will be appropriately bonded and connected to earth as required by codes and normal practice.

S. CONDUITS:

1. Use separate conduits for data and other control cabling. Control power and ground may be run with data for the same devices.

2. All conduits shall be concealed unless the owner has been notified in writing and accepts by written approval the location of all exposed conduits.

3. A pull string shall be left in place by the installing contractor after pulling all wiring through each conduit. This pull string shall be tied off at both ends and left for future use.

4. All lines, cabling or wiring in any conduit run must be free from any splices or junction points.

5. All lines, cabling or wiring must be free from damage. Any that exhibits stress, damage, intermittent signal problems, data errors or other anomalies due to excessive pull torque shall be replaced.

T. JUNCTION/GANG BOXES:

1. Unless otherwise specified all controls, receptacles, user interface stations, plugs and outlets shall be located in an appropriately sized gang box. No multi-gang backboxes with raised, tile ring, extension ring or mud ring style reducers to obtain the specified faceplate gang size shall be acceptable in lieu of the indicated device backbox.

2. Any junction (i.e. terminal blocks, punch down blocks etc.) shall be housed in metal enclosures with an attached ground. No such connections may be made in ceiling spaces or other areas without the use of a steel enclosure.

3. Any field added junction boxes shall be sized and located for ease of troubleshooting access and all connections within shall be connected on terminal strips, which are clearly identified, in a logical, consistent & permanent manner.

3.03 ASSEMBLY AND PRE-TEST:

A. LIGHTING EQUIPMENT (OTHER THAN FIXTURES):

1. All new equipment shall be turned on/burned in and tested prior to delivery to the site. No equipment may be delivered to the site without being fully tested off-site. The equipment does not need to be under load during this period. This includes, but is not limited to, the lighting control console, fader wing panels, video displays/monitors, remote focusing units, Blues System power supplies, portable network gateways/nodes, architectural control processors, followspot fixtures and related power supplies, network switches, portable dimmer devices and any other lighting related portable equipment. Burn in requirements do not apply to installed dimmer racks, grid iron junction boxes, individual dimmer modules or DMX distribution racks.

3.04 FINISHES & CLEANING:

A. All finishes shall be returned to their original finish and condition after any temporary machining or other work.

B. Cover any walls, furniture, finished floors and carpeted areas to catch all metal particles, grit, etc. that may occur during installation.

C. Cover and protect all equipment left or installed on site during construction.

D. Provide thorough cleaning of all work areas including vacuuming, spray cleansers and dust removal as required. Clean all equipment fan filters before final acceptance tests.

E. Provide a thorough cleaning of all lighting system and related devices, including but not limited to, fixtures, housings, racks, cables/cordsets, data lines, reflectors, lenses, modules, mounting pipes, controls, consoles, etc. regardless of status (new or existing to remain/reuse). Cleaning shall be after all dust/dirt creating work has been completed and just prior to walk-through/punch list and turnover to the owner.

F. Maintain clean work areas, removing all debris daily.

3.05 LABELING:

A. All switches, cables, wire, controls and outlets will be permanently and logically marked during installation. Submit to the consultant for approval a listing of intended nomenclature. Where possible engrave directly upon plates and assemblies. Where disassembly would be required the use of adhesive or screw on engraved labels will suffice. Engravings will be paint filled for best contrast with black or white paint.

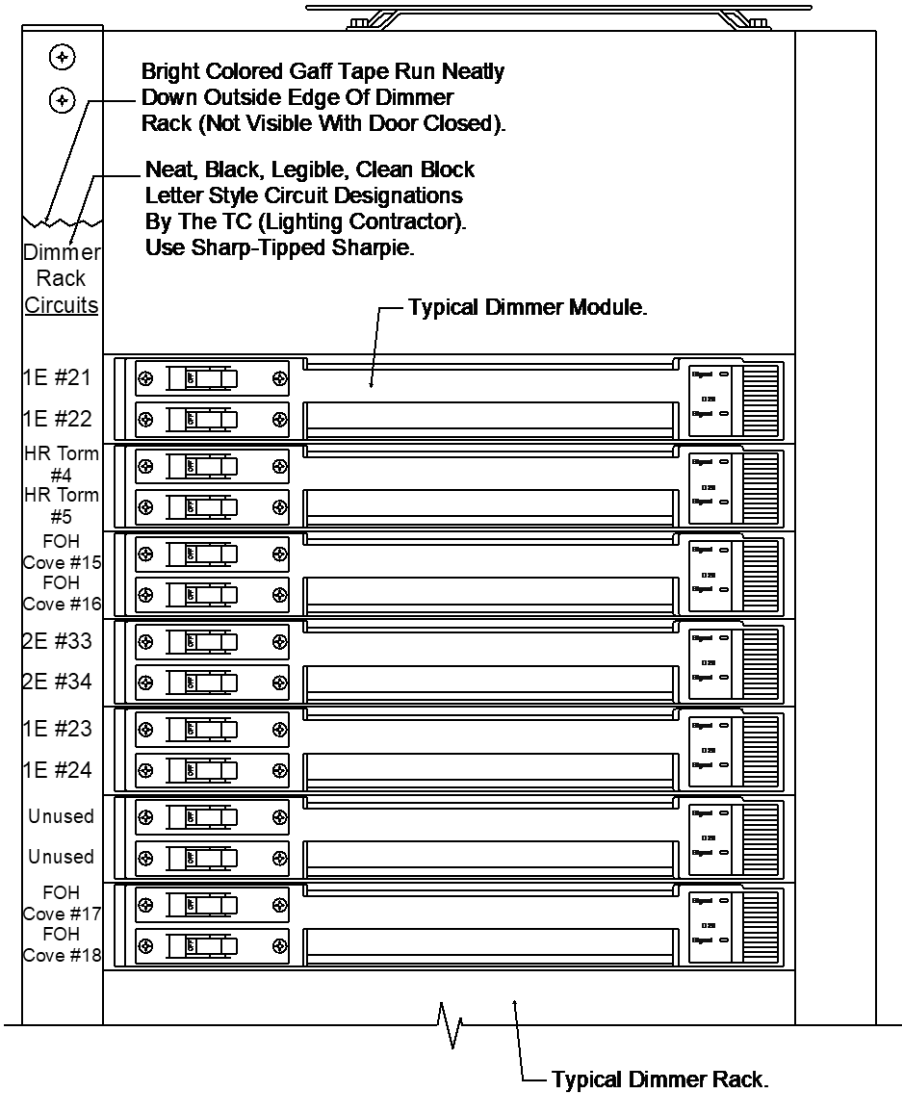
B. Do not use Dymo style labels or hand lettering. No cables shall be labeled with masking tape, gaffer tape or other material subject to degradation. Such labeling may be done on a temporary basis during installation so long as all such labels are removed and their adhesive cleaned off when final labeling is applied. Self-laminating labels are preferable for the final labeling system.

C. Permanently mark cables with an identifying label at each end in a consistent, logical manner.

D. Color-coding of the entire system shall be logical and adhere to accepted industry standards.

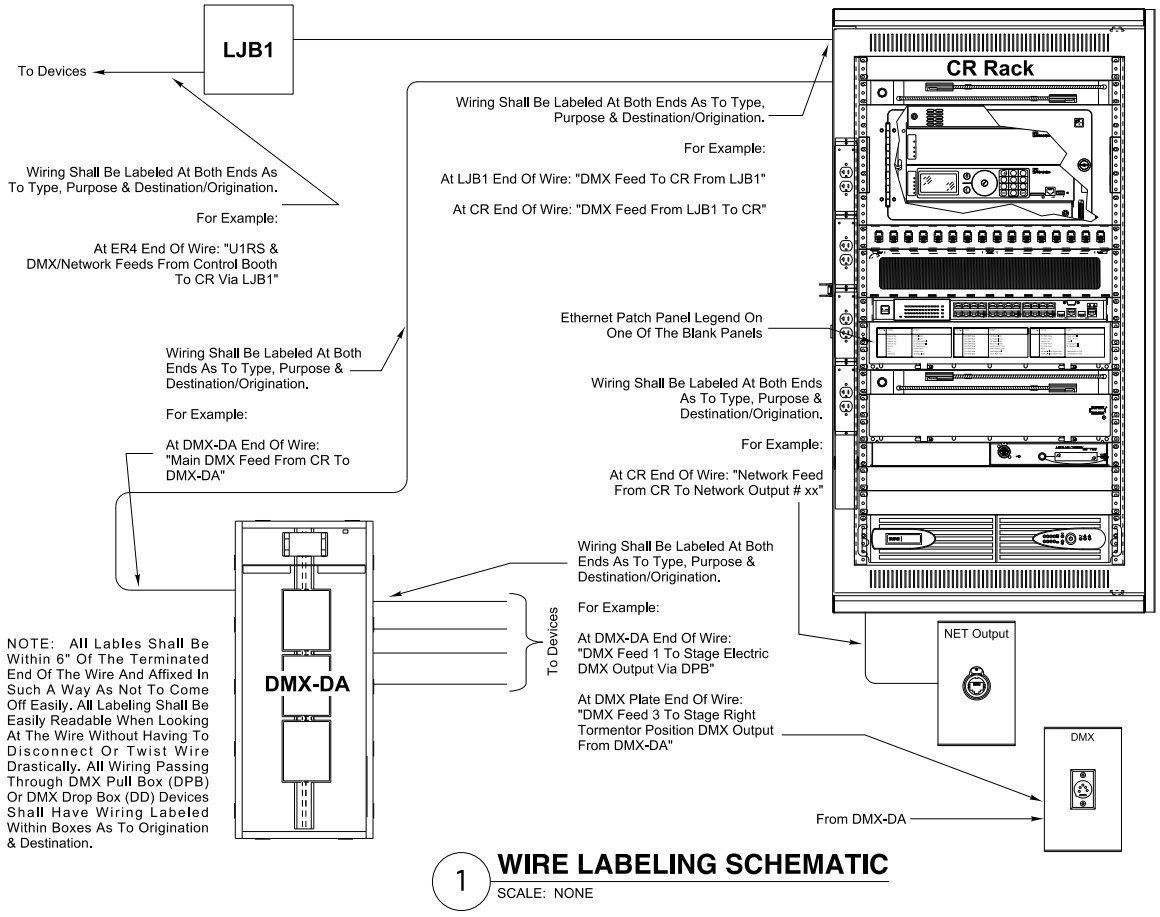
E. The contractor shall provide the owner with a laminated hard copy chart (Microsoft Excel style) of the dimmer channel assignments and locations along with any soft patched devices, DMX assignments, Network assignments, house, accent and worklighting channel assignments, submaster assignments, etc. to be left at the control console location.

F. The contractor shall label each circuit in each relay and dimmer rack (even ETR racks) as to its destination (permanent black marker on bright colored gaff tape is acceptable – printed legibly). Contractor may also use any style of durable, stick-on, printed style labeling that will remain adhered, is approved by the manufacturer, does not violate NEC and is large enough to easily read. Example for circuit #32 would be – "1E #32" (First Electric, Circuit #32) OR example for circuit #2 would be – "Cove, Circuit #2" OR example for circuit #102 would be – "Houselights R1" (row 1 of houselights). Contractor shall also provide multiple copies of a typed "spreadsheet-style" sheet showing all circuit assignments along with their destinations, designations, descriptions and locations to the owner for future reference. Place one laminated copy of this sheet on the wall beside the dimmer rack. See diagram below for more info. This includes any existing and to be reused dimmer racks - layout may deviate from what is shown due to physical differences and constraints of existing racks vs diagram that follows. In that case, provide labeling for each such rack that is as similar to what is shown as is possible, while placing labels as needed and in locations that make sense, do not impede airflow, module removal or rack functionality or violate existing rack manufacturer's specifications.



G. The following schematic diagrams have been provided as examples of acceptable and intended wiring & patch panel legend labels to be included for all racks, wiring destinations & originations: (these schematic drawings are diagrammatic only and do not

reflect all of the actual parts and/or components, etc. designed into this project.) Contractors (Both EC and theatrical/lighting contractors) shall use these schematic diagrams as guides and references and label or wire all related and additional devices in a similar manner to those shown here. These diagrams are typical of all lighting related devices, communications racks, etc. designed into this project. The intent is for all portions of this project to be labeled in a concise, intelligent and consistent manner. Provide patch panel legends for all network, 0-10V and DMX distribution (separate for each and located near related distribution equipment). Patch naming shall be concise, can be intelligently abbreviated and specific to locations. Matching names shall be located on all wiring (both ends) as well as on output plates.



1 **WIRE LABELING SCHEMATIC**
SCALE: NONE

3.06 RIGGING:

A. The following minimum standards apply in addition to the standards referenced elsewhere in this specification. These guidelines do not negate the standards referenced elsewhere in this specification.

B. All equipment not described as portable in this specification will be rigidly held in place as per the manufacturer's recommendations or as indicated.

C. All equipment (except luminaires) will be supported at a minimum of three points plus a backup. Each point shall be able to carry the entire rated load with a safety margin of at least five (5) times the rated load. All methods shall incorporate an independent safety backup with a safety margin of at least five (5) times the rated maximum load as installed in case of failure of any rigging component. All safety cables shall be installed so that

they have little to no slack in order to reduce shock loading in the event of a catastrophic failure of the primary rigging attachments.

D. All rigging and related fastening methods must be treated as permanent. All threads shall be treated with vibration compounds such as Vibratite or Loctite as per manufacturer's recommendations and shall be visible upon inspection.

E. All rigging hardware shall be load rated with the load rating or approval stamped on each piece of hardware.

F. No chain of any type will be acceptable for the hanging or backup support of any equipment except in the case of trim chains.

G. All trim chain shall be Peerless black theatrical chain type or equal.

H. No fabric or plastic devices of any type will be considered as acceptable methods of hanging of any equipment.

I. No stainless steel or galvanized wire rope shall be secured with Crosby clamps or other threaded type fittings alone. Compression type closures such as Nicopress with thimbles and copper sleeves ONLY must be utilized for all wire rope terminations. Each closure must have a backup closure. All wire rope is to have strain relief thimbles installed where it attaches to other rigging components. The contractor shall never violate the minimum bend radius when using or installing wire rope.

J. All loose ends of the wire rope will be neatly taped down after Nicopress is installed and crimped. No frayed rope ends will be allowed under this specification. This includes safety cables.

K. All Nicopress or equal compression connections and wire rope swaging products utilized on this project shall be required to pass field gauge tests as to their proper terminations and compression (typically referred to as go-no-go gauge tests). Due to the sheer quantity of manufacturer’s and the varying types/styles of compression tools in use, this will require the contractor to provide the proper go-no-go gauge during acceptance testing (punch list) for each different compression tool utilized on the project (typically a specific gauge is provided with each tool purchased). This gauge will be turned over to the consultant for use in verifying that the correct compression has been performed on the oval sleeves. It is understood that the consultant cannot test every single oval sleeve but will, instead, check a random percentage of sleeves that will be assumed to be typical of all similar compression fittings on this project. It is the contractor’s responsibility to verify, during installation, that every oval sleeve has been compressed properly and that it passes the go-no-go gauge test.

L. All Nicopress of equal compression connection thimbles shall be loaded (mounted) only on a round shaft. Thimbles through a punched hole or other where the thimble encounters an edge shall not be allowed.

M. Nothing shall be allowed into the interior of any Nicopress or equal compression connection oval sleeves except the wire rope itself. Any taping of wire rope ends shall be performed only after all compression connections are properly swaged.

3.07 ROUGH-IN:

A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners representative for approval before proceeding.

B. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.

C. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location and mounting height of all equipment in finished areas, such as thermostats, fixtures, communication and electrical devices, including panels. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for Diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.

D. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment.

E. For equipment and connections provided in this contract, prepare roughing drawings as follows:

F. Where more than one trade is involved in an area, space or chase, the contractor shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements.

G. Provide code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation.

H. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location. Submit as part of submittal package prior to installation. Do not install prior to written approvals.

I. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings. Submit as part of submittal package prior to installation. Do not install prior to written approvals.

3.08 CUTTING AND PATCHING:

A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction work on the architectural drawings. Refer to "General Conditions of the Contract for Construction" for additional requirements. Patch all cut or abandoned holes left by removals of equipment or devices. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering or other finished surfaces. Patch openings and damaged areas equal to existing surface finish (i.e. “patch to match existing”). If no instructions exist in the contract documents addressing these issues, then the contractor shall contact the architect and construction manager in writing prior to proceeding with any work in order to obtain written instructions regarding this type of work.

3.09 CONCEALMENT:

A. Conceal all contract work above ceilings and in walls, below slabs and elsewhere throughout building (this does not include lighting fixtures, control consoles, user interface stations, etc.). If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review and written authorization and instructions on how to proceed.

3.10 PERFORMANCE:

A. The systems will be utilized for lighting various types of performances from solo artists to large groups. The intent is for the preset lighting controls to accommodate most of the general lighting needs. The owner will compile a list of presets to be loaded into the control system. These presets will consist of a prefocused aiming of all lighting instruments.

B. All LED fixtures shall exhibit quiet operation (the preference is for all fixtures to be convection cooled). Audible requirements for ALL LED fixtures is as follows:

1. No LED fixture shall be allowed that exceeds an NC10 noise curve as measured 4’ – 0” from any point of the fixture.

2. NC measurements shall be dBA and measured in 1/3rd octave resolution.

3. For fan cooled devices, the fans are normally to be set up and operated in auto mode.

4. Any fixtures and fixture fans that exhibit or develop a tonality within the first 12 months of use shall be replaced by the contractor at no additional cost to the owner and within a reasonable amount of time (typically less than 2 weeks).
** Tonality shall be defined as any frequency or frequency bands that are narrower than 1/3rd of an octave that exceed the average adjacent background level by more than 3 dB as measured on an FFT style trace. This is typical of both fundamental frequencies as well as any related harmonics.

C. For relay circuits powering LED fixtures, set dimmer profile to be on in all cues, etc. so that LED fixtures are always powered on during performances. Relays shall be set to be turned off when system is not in use in order to preserve drive electronics estimated max life cycle. Perform this function in the architectural control system programming software.

D. Program all touch screens, including magic sheets (with graphic overlays of the space as well as with fixtures by group) for the owner’s use.

E. Program all theater lighting presets to maintain the minimum required egress levels of lighting at all times and in all cues based upon life safety code NFPA 101 & local building codes. The minimum egress lighting level is .2 fc.

F. Provide custom signage for the dimmer/relay rack location as indicated. Provide all nomenclature indicated plus additional as applicable. Mount signage on an adjacent wall near the dimmer/relay rack as space allows.

G. Provide the consultant, owner and architect with the following files as it regards the lighting system, control console, paradigm system, misc. Devices and controllers. All project related final lighting system files shall be provided in both compiled and uncompiled (editable) formats and in the current software/firmware format. All files must be named so that identification as to project, file type/intent, etc. Is readily identifiable from the name alone. Provide all files saved to a thumb drive:
1. ETC Paradigm Lightdesigner config file
2. ETC concert config file
3. ETC console template/show files
4. All console template files
5. Network system config files

H. LED fixtures: all fan-cooled LED fixtures must have the ability to be run at full light output (typically full white) for a 4-hour minimum without light output reduction and without the fan speed ramping up to a level noticeable to a listener from a distance of 6' - 0" away (see noise requirements above). Fan speeds must be assigned to a DMX channel, configured by the setup technician and locked so that they are at the lowest fan speed setting possible while still maintaining full light output out of the fixtures. The cumulative

fan acoustic output must be inaudible in the seating area, no matter how many LED fixtures are on. This configuration must be field verified on site for an 8-hour minimum - (2) 4 hour cycles. The total light output shall, at no point in time, be allowed to automatically dip below 90% overall output (unless specifically being dimmed for a theatrical reason) in order to enter a "self-protection" mode or other automated cycle designed to prevent the fixture from overheating. See written specifications for more information and noise curve requirements for all LED fixtures.

I. Provide the owner with a copy of the pathway Pathport manager gateway configuration editor (5.3 or later) or equal, VIA Manager software (if applicable) DMX/RDM device configuration software and 12 hours of additional training on those platforms (in addition to training noted elsewhere on the drawings or in the written specifications) so that the owner or owner's designated operators will have a full working knowledge of how to address, readdress, maintain, troubleshoot and reconfigure the network gateways located within this system.

J. Post a complete copy set of the lighting system one-line diagram, system as-built drawings, laminated excel spreadsheets of all circuit & DMX/network assignments, etc. as listed on TL flow diagrams) in the CR rack drawer. Provide an additional laminated circuit assignments sheet for the lighting console position.

K. Training & Instruction:
   1. Provide all on-site owner training, software training, architectural system preset programming (including pushbutton & LCD stations), edited DVD training video, bench & field focus of fixtures, etc. As detailed on the bid drawings and in written specifications. (training, DVD, focus and programming time is extensive and detailed). See specs for total quantity of hours of training, focus and software programming requirements that the owner is entitled to as part of this bid package. All items shall be provided as a part of his bid at no additional cost to the owner after bid. Owner is not obligated to receive all training time; however, all training time, etc. As listed above, in written specifications and on the bid drawings is the sole responsibility and obligation of the contractor to provide. All training shall be at times and in duration as directed by the owner and shall be held on-site at the owner's facilities.
   2. Give the owner detailed and specific instructions on powering/depowering and the insertion/removal of PowerCon power connectors for any LED fixtures included in this project. Since the PowerCon connector is a connector without breaking capacity, these connectors should not be inserted or removed under load or when live. Per the manufacturer's instructions, the user is to disconnect the end of the power cable that is plugged into the wall outlet/distribution first and prior to insertion/removal of any PowerCon connectors. Failure to do so may damage, pit or char the contacts inside of the PowerCon connector, rendering them unable to make proper contact and unusable without replacement of the PowerCon connectors. Any such damage to the PowerCon connectors due to failure to disconnect the fixtures from power first will result in factory repairs that will not be covered under warranty.
   3. Give the owner detailed and specific instructions on (as well as turning over a copy of the manufacturer's safety notice data sheet) on the hazards that may be associated with the improper use of Neutrik PowerCon True1connectors.

L. LIGHTING SYSTEM NETWORK:
   1. Design and provide all LCD touchscreen layouts as indicated in the written specifications.
   2. Provide all ethernet style switches to be power over ethernet switches with all ports/outputs powered. Provide quantity of switches and outputs in order to output signal to all lighting system network devices.

3. After final system setup and configuration, provide the owner with a USB flash memory drive (memory stick or thumb drive) device with a complete copy of the "as built" system configuration stored on it - including electronic as built drawing set (4 GB drive - in addition to other drives noted).
4. Instruct the owner on how to make basic system and preset setup changes with a standard web browser (via LightDesigner access).
5. The lighting system network shall not be hardwired to or capable of being interconnected with the building-wide network or direct access to a gateway providing internet (world wide web) access. The lighting system network is comprised of simple network devices that do not have the capability or protection to remain immune to viruses, etc. The lighting system network must remain a stand-alone network. Failure to segregate the lighting system network from the building-wide network and internet access could result in a catastrophic failure of the entire lighting network and loss of vital data (including show files, system patch, fixture profiles, default system setup, etc.) If infected with a computer virus, and which would result in the need for a total system reboot back to factory defaults (all "as built" system configuration files would then need to be recreated from scratch).

M. Verify the load requirements for all PoE switch outputs and the related devices being powered via the network switch. Provide a switch that is capable of powering all network devices & outputs indicated per the manufacturer's recommendations.

N. Perform all DMX and network programming, dimmer assignments, device addressing and related software/firmware setup, LED setup, modes and addressing, etc. All LED fixtures, network gateways, houselighting fixtures and RDM setups and any other DMX/network/RDM addressable devices shall be addressed in an intelligent, consecutively numbered, individually addressed manner prior to completion of the project and final acceptance tests.

O. Work closely with related trades in setting up, testing, verifying and tweaking the houselighting system, lamps, etc. In order to get consistent and acceptable results. This includes DMX/RDM setup of houselighting fixtures, populating those fixtures into the architectural control system, dimming rack control module and lighting control console, dimmer module curve settings, providing/swapping out indicated modules for modules that will control the associated fixtures better (i.e. ELV's for D20e's, etc. As needed), assisting in visual confirmation of performance acceptability, recording lighting performance visuals for record and any other items as noted in ec houselighting notes or other required coordination. Obtain a written sign-off acceptance by the owner of visual performance of the houselighting system prior to finalizations & programming.

P. All connector strip, outlet box, gateway, etc. Devices must have the proper grommets and strain relief devices in place from the point where the loose or multicable wiring enters the device and at all connection/transition points into the related device. Devices without grommets and strain relief shall not be allowed.

Q. Verify the actual electrical loading demands of all devices plugged into indicated UPS devices and provide appropriately sized backup UPS devices as needed, even if that means providing upsized devices beyond what is indicated in order to meet the actual electrical demands of the serviced devices. No UPS device shall be allowed to be loaded past 90% of its rated capacity.

3.11 INITIAL POST COMPLETION TESTS & SET UP:

A. ARCHITECTURAL CONTROL STATIONS:

1. All architectural control stations (pushbuton, key stations, LCD stations, etc.) shall be named in the Light Designer and Control Designer software so that they reflect the actual room and geographic locations within the room (i.e., Auditorium South Entrance, etc.).

2. Room, entry or other names and designations TBD by owner. The contractor shall obtain these descriptions from the owner in writing prior to ordering these faceplates or programming the architectural control system. All stations shall be labeled with the owner indicated names and with specific nomenclature as indicated on the bid drawings. No device model number names shall be allowed. Names shall be engraved on device plates with a high contrasting color in a legible, large enough font size so that they are easily seen and read. No black on black or self-adhesive tape labels shall be allowed.

B. ARCHITECTURAL SYSTEM PRESETS:

1. Architectural lighting will be included in the preset configurations.
   a. The presets to be programmed by the lighting contractor will consist of no more than 10 presets for architectural lighting. The presets will be determined by the owner and consultant.
   b. The contractor shall program the houselighting presets to minimize hotspotting, dark rows and large footcandle variations from row to row. Contractor shall coordinate preset setup with the owner and consultant. Preset looks shall be finalized only after most room treatments, etc. have been completed and with the consultant present.
   c. All pushbutton stations shall be programmed so that, when no presets are selected and no lights are on, there is an LED or button on each station that is lit at all times so that the stations are readily visible in the dark.
   d. All faders shall be programmed per owner's instructions (typically faders control groups of similar fixtures and/or fixtures in similar locations as a group).
   e. All pushbutton stations shall be programmed so that engaging any particular pushbutton toggles the associated preset on and off with subsequent pushes of that button. All preset pushbuttons shall trigger mutually exclusive presets (turning the previous preset off as it engages the selected preset) and shall not operate in a pile-on style hierarchy. In other words, if a user engages preset #1 by pressing the associated button, this should trigger all previous light levels or presets to “off” and turn “on” or trigger the lights and light levels associated only with that particular button and preset.
   f. The architectural control system shall be programmed so that, whenever any preset or LCD station pushbutton is pressed, all relay modules powering any LED fixtures in the room are immediately powered on. These relay modules shall remain on and shall be turned off by astrological clock for overnight hours as indicated.
   g. The dimming system shall be programmed so that, when the lighting control console is powered on, all relay modules are immediately energized (turned on).
   h. Architectural Station Presets:

1) All preset stations MUST be set up and loaded with the “looks” as directed by the owner. The contractor shall not decide for himself nor preload any temporary preset looks into the architectural control system that the owner hasn’t desired. The contractor should obtain all of these programming directives in writing prior to system turn-on so that they can be easily programmed during commissioning, etc.
2) All preset buttons located on pushbutton stations shall have the capability to respond to whichever preset the owner wishes, including conventional theatrical, houselighting and LED color mixing fixtures. In other words, the pushbutton stations shall not be restricted as to which system preset each button or class of stations can trigger.
3) UH10001 (1 Button Stations): If station(s) on stage, it should be programmed to turn on/off the stage worklights ONLY. If station(s) located in catwalk or at catwalk entrances, they should be programmed to turn on/off the catwalk worklights ONLY. If station(s) in the auditorium area, then they should be programmed to trigger one preset as directed by the owner.
4) UH10005 (5 Button Stations): These stations are typically programmed to recall the first four system presets from the architectural controller and off. Contractor shall program each station to control presets as directed by the owner.
5) UH10010 (10 Button Stations): These stations are typically programmed to recall the first nine system presets from the architectural controller and off. Contractor shall program each station to control presets as directed by the owner.
6) Interactive Technologies (8 Button Stations): These stations are typically programmed to recall the first seven system presets from the architectural controller and off. Contractor shall program each station to control presets as directed by the owner.
7) LCD Touchscreen: The LCD devices shall be programmed with preset and/or fader pages for the owner’s use as described below and on drawings. LCD screens shall “mirror” each other as to the current “state of affairs” so that both screens look identical and that user selected moves are shown on both screens (just as if the user were controlling both) and so that there is a visual confirmation on both screens of the last user selected move, selection or parameter change.
    a) Contractor shall provide the owner with a saved version of the final system configuration as a backup copy in case of system failure and/or system reset needs may arise. Provide two copies (one copy on each of two USB thumb drives. One copy to be placed in a Ziploc bag at or near the architectural control processor or lighting system control area and one copy to be located as per the owner’s instructions – preferably in a separate, secure and remote part of the facility).
    b) Contractor shall provide the owner with a complete hard-copy listing of all lockout values, unlock codes, visibility values & preset priority values used within the system configuration and with training on how to alter or change those codes. Contractor should also enter all passwords and lockout codes into the “Job Information” section of the Unison configuration file so that they will be saved along with the as-built system configuration.

c) Any disabling of the pushbutton stations by a password entry shall be reset at midnight of each day via the astrological clock function so that preset stations operate normally and are not locked out continually.

C. TOUCHPANEL SETUP:

1. Intent: Touchpanel screen layouts shall be similar to what is shown. Not all control screens have been shown, but a representative sample has been provided so that the contractor gets a real sense of the intent of the look and layout and feel of each touchpanel. Buttons shall be gel style as noted. Touchpanel background shall be a slate/silver grey color with a brushed aluminum look. Buttons shall be a royal blue color. All gel button text shall be black, unless otherwise noted. Dialing and QWERTY keypads, drop down dialog boxes, etc. shall be black background with white text and shall float over other control screens (feather backpanel edges as needed). All buttons shall be high-resolution, crisp edged buttons that do not appear with jagged edges, pixelization, etc. The control screen layout file shall be sized so that it fits onto the allotted memory inside the specified touchpanel. There may be additional screens and controls that the contractor will need to program into the touchpanel system that do not appear in the following descriptions or on the detailed screen layout drawings. The contractor shall provide all screens & programming necessary for a complete system and may need to field tweak or add/delete functionality to the touchscreen system based upon immediate user and consultant feedback. Color selections for screen background, font colors, etc. shown on the contract documents shall be followed unless the owner has a specific preference as to the color scheme, layout, etc.

2. The contractor shall be required to coordinate with other contractors providing touchscreens for this project so that the theme and layout of all touchscreens within this space match.

3. The info button on each screen, if touched, shall bring up a floating, pop-up window on top of and centered on the current screen that gives a brief, but detailed, explanation of the intents of the screen and the parameters the user must select.

4. Each touchpanel screen shall incorporate a standard “Home Screen” that uses the owner’s logo as the background behind all button/preset display overlays. Actual logo to be used is TBD by the owner. Contractor is to obtain appropriate file from owner. Size logo on screen as directed by owner.

5. Each touchpanel screen shall incorporate a “Home” button or object on every screen (or physical button on unit – if screen is so equipped) that will take the user to the home screen (Main Menu) whenever this button is activated.

6. Each touchpanel screen shall incorporate a “Back” button or object on every screen, except the Home screen, (or physical button on unit – if screen is so equipped) that will take the user back to the previous page/screen whenever this button is activated.

7. All touchpanel buttons shall be programmed so that, when a button or preset is selected, the active icon highlights or changes color and becomes visually distinguished from all other buttons/presets on the page in order to easily identify and indicate which button or preset has been activated and is currently active.

8. Contractor is to submit all screen layouts (jpeg screen shots are acceptable) to the consultant for final approval prior to loading all software.

9. Contractor is responsible for all touchpanel and control system programming and final touchpanel screen looks, layouts and icons and for interfacing each piece of controlled equipment with the lighting control system and other related systems (such as Crestron interfaces, iPad, iPod, iPhone apps, etc.).

10. The contractor shall provide a minimum of two levels of password/passcode access to the touchscreens and their functionality. There shall be a user level password access, which limits those users to only certain functions. There shall be an administrator level password access, which provides those users with unlimited access to all system functions present and programmed.

11. The contractor shall provide all touchscreens to mirror each other and so that system selections, etc. performed on one screen automatically show up on all other architectural control screens.

12. The contractor shall provide, as part of his bid price, all touchscreen layout buttons, menus, background, layout, programming, etc.

13. All access to the LCD programming functions, preset changes, clock functions, recording capabilities, etc. shall be password protected.

14. Program the architectural control system LCD displays with a submasters page, rehearsal light preset, choral group preset, several houselighting presets, stage worklight preset, stage wash preset, colored stage wash preset(s) and other presets as determined by the owner or owner's representative and as required in the written specifications. LCD displays shall be programmed so that users without a passcode are unable to access any incandescent houselighting fixtures except turning any included day-to-day fluorescent/LED houselight, catwalk worklight and/or stage & wing worklight fixtures on or off.

15. Create & setup at least 20 preset buttons on pages (10 per page and in addition to other presets as called for in the specifications) and there must be a record button on each page. The intent of this is so that the owner can easily, with password access, save/record "looks" to presets quickly & easily into the architectural control system.

16. A secondary level of password protection shall be setup so that all other LCD and pushbutton stations can be locked out from functioning or altering the lights during an event. The intent of this feature is so that accidental activation of unwanted lighting fixtures during a performance is avoided. Program the astrological clock to reset all LCD and pushbutton station functionality (and deactivate lockout) at midnight of every day - 365 days per year.

17. LCD touchscreens shall be located within the system topology in such a way as to allow snapshotting functions from the lighting control console into the architectural control system LCD and pushbutton units. All LCD touchscreens shall be mirror images of each other (both containing the same screens, information, etc.).

18. LCD touchscreens shall recall all presets and shall incorporate fader and button pages, etc. See above and specifications for more information on LCD programming requirements.

19. Program the LCD screens with basic "color chooser" pages for the LED fixtures (arranged by zone) so that the owner may quickly and easily pick one of 20 colors for any bank of LED's. Color chooser pages shall visually show thumbnails of colors (similar to the output color of the LED fixtures) and allow the user to touch a colored button in order to switch all of the LED's in that bank to that color.

20. LCD screens shall have no limitations as to which fixtures or DMX universes they can access and/or control. I.E. they must be able to recall whatever preset looks the owner wishes them to recall.

D. Sample Screen Shots: (See contract drawings for actual screen shot examples of the intents of the LCD screens that must be included and the general layout of each screen).

E. DMX & UNIVERSE SETUP GUIDE:

1. The goal in setting up the DMX addresses for this project is to make things simple for the end user both in operation of the system and in finding fixtures, dimmers, relays, etc. This type of approach will embrace a compact setup/layout. It is our intention to outline a conceptual path forward without actually assigning universes and/or actual addresses. That will still be left up to the contractor to figure out and perform based upon the final fixture count, selections, owner input, etc.
2. The initial objective is as follows:
3. DMX Assignment Order (addressing given/shown on an ascending order priority basis) –

a. Dimmer rack and dimmed modules (incandescent fixture control)

1) Beginning with DMX address #1 and continuing in ascending order without gaps in assignments until all dimmer rack/dimmed modules have been addressed.

b. Relay rack and non-dimmed and/or constant/relay modules (LED & moving head fixture control)

1) Beginning with the next free address after the last dimmer rack/dimmed module address and continuing in ascending order without gaps in assignments until all non-dimmed, constant and relay modules have been addressed.

c. Addressing for theatrical fixture lighting devices

1) Beginning with the next free address after the last non-dimmed, constant and relay module address and continuing in ascending order without gaps in assignments until all theatrical fixtures have been addressed.

2) Fixtures should be addressed in the following ascending order: front of house (first cove, second cove, etc.), stage (1st electric, 2nd electric, 3rd electric, etc.), side house lighting (side galleries, Shakespeares, tormentors, balcony pipes, etc.) *.

3) Fixtures should be grouped by type and assigned DMX addresses as such at each location for ease of use (i.e. wash fixtures then ellipsoidal fixtures, then zoomable fixtures, etc.). The exception to this is stage LED strip borderlight style fixtures, which would typically be grouped into a range of DMX addresses so that they can be quickly and easily selected as an entire stage wash.

d. *As an alternative, the owner might select to have the side house lighting (galleries, torms, etc.) occur before the stage assignments.

e. House and work lighting fixtures (incandescent, LED or 0-10V fixture control)

1) All houselighting fixtures (at the top of the address order beyond all other utilized DMX addresses – and within the control system's capabilities).
2) All worklighting fixtures (at the top of the address order beyond all other utilized DMX addresses, including houselighting assignments – and within the control system's capabilities).

4. The intent is that all DMX addressing should occupy as few universes of DMX control as is possible and without the facility's DMX addressing being spread over multiplied universes of control. What should be avoided is assigning each physical location to a different DMX universe (i.e. first electric DMX universe #1, second electric DMX universe #2, … houselighting to DMX universe #7, etc.).
5. A typical layout would look like the following:

DMX Assignment Schedule				
Description	*Fixture/Dimmer #*	*DMX Channel Assignments*		
Dimmer Rack (DR1)	Dimmer Channels #1 - 35	1	-	35
	Relay/Non-Dimmed Channel #1 - 61	36	-	96
Cove/Catwalk - ETC ColorSource Spot LED	RGBL Front of House Cove Spot Fixtures #1 - 10	97	-	146
Cove/Catwalk - ETC ColorSource Par	RGBL Front of House Cove Wash Fixtures #1 - 6	147	-	176
Rear Torm - House Left - ETC ColorSource Spot LED	RGBL Rear Torm Spot Fixtures #1 - 3	177	-	191
Rear Torm - House Left - Philips Showline SL Punchlite 220	RGBL Rear Torm Remote Zoom Fixtures #1 - 3	192	-	245
Rear Torm - House Right - ETC ColorSource Spot LED	RGBL Rear Torm Spot Fixtures #1 - 3	246	-	260
Rear Torm - House Right - Philips Showline SL Punchlite 220	RGBL Rear Torm Remote Zoom Fixtures #1 - 3	261	-	314
Front Torm - House Left - ETC ColorSource Spot LED	RGBL Front Torm Spot Fixtures #1 - 3	315	-	329
Front Torm - House Right - ETC ColorSource Spot LED	RGBL Front Torm Spot Fixtures #1 - 3	330	-	344
Stage - First Electric - Philips Showline SL BAR640 Wash Borderlight Fixtures	RGBW Wash Fixtures #1 - 4	345	-	404
Stage - Second Electric - Philips Showline SL BAR640 Wash Borderlight Fixtures	RGBW Wash Fixtures #5 - 8	405	-	464
Stage - Third Electric - Philips Showline SL BAR640 Wash Borderlight Fixtures	RGBW Wash Fixtures #9 - 12	465	-	524

Stage - First Electric - ETC ColorSource Par	RGBL Stage Wash Fixtures #1 - 4 (Stage Electric #1)	525	-	544
Stage - Second Electric - ETC ColorSource Par	RGBL Stage Wash Fixtures #1 - 4 (Stage Electric #2)	545	-	564
Stage - Third Electric - ETC ColorSource Par	RGBL Stage Wash Fixtures #1 - 4 (Stage Electric #3)	565	-	584
Houselighting Fixtures	Rows #1 – 6	585	-	590
Worklighting Fixtures	Stage Hi-Bays	591	-	592
Worklighting Fixtures	Catwalk	593	-	593
N/A	Any required DMX addresses necessary in order to address and control the DMX or 0-10V misc. fixtures, outlets, etc.	As required		
This DMX Assignments Chart Is Intended To Be A Starting Point Or Failsafe In Case The Owner Has No Particular Addressing Preferences; However, The TC Shall Consult The Owner Prior To Addressing Any Fixtures With A Printed Copy Of This List And Work Out All Specific Assignments With The Owner Prior To Addressing Any Fixtures As The Owner's Wishes May Differ From What Is Shown Here. Get Owner Approved DMX Assignments In Writing Prior To Assigning Any Fixtures, Dimmers, Misc. Portable Devices, Houselighting Fixtures, Etc.				
DMX Assignments Approval:	Duly Authorized Owner Or Owner's Representative Signature:			
Approved As Indicated:	_____			
Approved With Indicated Changes:	_____			
Written Name:	_____			
Date:	_____ / _____ / _____			

† Always obtain final owner sign-offs for all DMX assignments. Failure to do so could result in the contractor having to reprogram all or large portions of the lighting system in order to accommodate the owner's wishes.

3.12 OWNER INSTRUCTION:

A. The contractor shall provide a training program for the owner at the project location and with the project equipment (owner's equipment), consisting of the following hours/periods of instruction specifically and exclusively regarding the theatrical lighting systems and related equipment. This training time shall not exceed (36) hours. No training block shall be less than four hours in duration. This time is in addition to training times noted below.

B. The contractor shall provide additional software training for the owner of (12) hours specifically and exclusively for moving head and/or motorized zoom fixtures.

C. The contractor shall provide additional software training for the owner of (12) hours in adjusting basic settings to system presets, misc. reprogramming, etc.

D. The contractor shall provide additional software training for the owner of (12) hours in operating, configuring and programming in the Pathport Manager x.x (latest non-beta version) software and in operating, configuring, resetting, managing and changing all network and gateway parameters/assignments.

E. All owner instruction shall be provided by the contractor as part of this contract shall be scheduled and performed within twelve months of the final system turnover date to the owner.

1. The turnover date is defined as the date of completion of all open punch list items and final acceptance by the owner.
2. Attendees/trainees shall be as designated by the owner and may consist of multiple groups requiring separate training sessions on the same topics (all sessions must fit into the training times as allotted above).

F. All owner instruction training hours are exclusive of travel time. Training time hours will begin to elapse at the prearranged hour agreed upon by both the owner and the contractor.

G. Training time may be utilized in any number of ways that may not relate directly to the hands-on training. These required hours can be utilized in order for the contractor to perform additional system programming, set manipulation, customizing layouts, control screen optimizations/changes or any other related work requested and approved by the owner – up to the “not to exceed” hour totals listed in these specifications. Additional training or programming work beyond that indicated in these specifications shall be at additional cost to the owner.

H. It is understood that, if there are multiple spaces/locations (e.g., high school auditorium, middle school gym, elementary school cafetorium, etc.), the training sessions noted shall be required independently at each facility.

3.13 TRAINING:

A. Training must provide useful information that covers all major topics of how a system would typically be used by an end user/owner. This also applies to documentation and video training.

B. Provide training only at the request of the owner’s authorized representative(s). Make clear (in writing) to the owner’s authorized representative(s) that any training hours not formally requested, scheduled and performed within twelve months of the final system turnover date to the owner shall be forfeited.

C. Track all training hours in writing and provide copies of attendance sheet sign-offs to the owner of who attended, how long each session lasted and what topics were covered.

D. On a job-by-job basis the training sessions may vary significantly. The training hours allotted may be used by the owner as required for any purpose related to the system and in any number of ways that may not relate directly to the hands-on training. These required hours can be utilized in order for the contractor to perform additional system programming, fixture manipulation, customizing layouts, control screen optimizations/changes or any other related work requested by the owner – up to the “not to exceed” hour totals listed in these specifications.

E. Additional training or programming work beyond that indicated in these specifications or

after the initial twelve-month period shall be at additional cost to the owner.

F. Turn over copies of all video recorded training to the owner as described below.

G. It is recommended that most training be hands on with the owner's personnel operating the equipment.

3.14 QUALIFICATIONS OF TRAINERS:

A. All persons performing system training must be experienced operators of the specific equipment they are training others to use. If no one on the contractor's staff has experience on a specific device or piece of equipment, then the contractor must provide qualified third-party personnel in order to perform those training sessions.

3.15 SCHEDULING FOR TRAINING:

A. All training sessions must be scheduled with the owner and by the contractor with at least two weeks advanced notice.

B. If the contractor arrives for a scheduled training session and the owner personnel are not present, then the contractor must notify the owner that a four-hour training segment has been forfeited.

C. If a scheduled session lasts less than four hours, it will still expend four hours of allotted training time due the owner.

D. Training session must be scheduled and performed at a time when the space is available and otherwise unoccupied.

E. Coordinate all training sessions with the owner, all uses of the room, any related contractors, attendees, etc. Training sessions, especially those being videotaped, shall not be allowed while other uses of the room are in session, especially those involving the use of construction equipment, drills, saws, rehearsals, etc.

3.16 EXAMPLE TRAINING SCHEDULE:

Typical Training Hour Breakdown		Typical Content
	Hours	
System overview and basic Training	4	Full Walk around, system layout, power sources etc. And an overview of operation. Set up and loading, saving, etc. show files, cue stacks, etc. How to approach a new show.
iPad remote access set up, operation, integration, etc.	4	This session can be the same day as system overview if schedule allows. Understanding the file and Library system, how to update libraries, saving show template files, use of remote devices during show focus, etc.
DMX/RDM Overview	4	Training users on the overall concept of DMX addressing, DMX topology, RDM implementation & assignments, moving fixtures and relocating addresses, etc.
Special Effects	4	Using fixture and/or console special effects, color pickers, cue timing, etc.

Assistance with setting up first Event	4	Show files, presets, global techniques, etc.
On site for first show as tech support	4	
On site for Second show as tech support	4	
Follow Up/Higher Level Training	4	
	32	Total Allotted hours vary on each project, this is just an example.

3.17 INITIAL TRAINING:

A. Walk through the facility and familiarize the owner with where all primary system equipment is and what it does. See below for additional instructions and requirements for training sessions, video recording/documentation, etc.

B. Training on Lighting Control Console Operations (list is not exhaustive):

1. Power up/power down sequences.
2. Touchscreen setup and use.
3. Magic sheet creation and use.
4. Template and show file use.
5. Setting up and using submasters.
6. Setting up cues, scenes, presets, base show files, saving files, importance of backups, working from templates and other primary and commonly used functions.
7. RDM access fixtures & programming.
8. Patching the dimmer/relay racks to the console.
9. Restore techniques for console (back to factory defaults).

C. Training on Lighting Fixtures (list is not exhaustive):

1. RDM access fixtures, on-fixture controls & programming.
2. Fixture cleaning and maintenance.
3. Specialty fixture specifics – moving heads, remote zoom, motor noises, fan speeds, move-in-black requirements, etc.
4. DMX addressing conventions, how to implement changes when physically moving/relocating fixtures, etc.
5. Boot up sequence timing, etc.

D. Training on Lighting System Architectural Controls (list is not exhaustive):

1. Touch screen controls & programming.
2. Pushbutton/fader controls & programming.
3. General station cleaning and maintenance procedures.
4. Lockout functions and release.
5. Use of astrological clock, timed events & sequences, etc.

3.18 VIDEO RECORDING OF TRAINING WITH OWNER – INITIAL TRAINING:

A. Record all aspects of the initial owner training with the group of trainees present. A live training session by default may be interrupted with questions or unrelated discussions, which is acceptable. The camera should record through the entire session, unedited.

B. Provide simple explanations of what each piece of lighting equipment does/what it is

intended for, how to properly interface with that equipment (controls, consoles, stations, gateways, etc.), present an overview of general programming parameters as well as what an end user should do if a piece of lighting equipment fails, if the motorized fixtures (if present) were to be shut down or become non-functional, etc.

3.19 VIDEO RECORDING OF DEVICE TRAINING – SECONDARY TRAINING:

A. Device specific training shall be recorded by the contractor independent of the initial training session. This recording should be performed in the contractor's shop, at the owner's site without trainees present or at another location as appropriate. The intent of this training is to give specific, guided instruction on each piece of equipment. Where manufacturer's professionally produced video trainings are available (vie YouTube or manufacturer's website), these will suffice. The contractor should then supplement these with all other video training requirements presented in these specifications. The preference is for the contractor to offload manufacturer training videos onto a thumb drive to present to the owner; however, active links to these videos embedded in the final O&M documentation is an acceptable alternative.

B. The secondary video training must provide:

1. A video tour (walk-through) of the lighting system equipment present at the owner's site that clearly shows where all primary lighting system equipment is located, gives a brief overview description of what that equipment's primary functions are and what any related devices, screens or indicator lights look like when everything is working properly. This video should not exceed 30 minutes in length.
2. A video tour (walk-through) of the lighting system related power panels, breakers and disconnects feeding the system equipment (dimmer/relay rack, ELTS2, EM devices, etc.), which breaker operates each power feed and what the normal state looks like. Room names, numbers and locations that conform to site nomenclature should be used throughout. This video should not exceed 10 minutes in length.
3. For all lighting system elements note all control boxes, their use and how to check for trouble status in controls, how to initiate and complete any required reset procedures, etc. This video should not exceed 10 minutes in length.
4. A separate video should include a discussion of emergency procedures, manufacturer 24-hour service hotline phone number, system reset procedures, meanings & intents of safety signage, safe "work-at-height" procedures, overall safety precautions and behaviors, etc. This video should not exceed 15 minutes in length.
5. A separate video should include a series of quick start videos for someone who must use the lighting system equipment who has no idea how to operate any portion of it (A Beginner's Guide). Each related video clip should not exceed 5 minutes in length.
    a. Example:

1) How to boot up the console.
2) How to access a show file.
3) How to run a cue.
4) How to navigate screen pages, how to find magic sheets and how to operate them.
5) How to navigate screen pages on individual fixtures (rear fixture control screen), determining and/or changing fixture DMX address, etc.
6) Basics on lighting priority – why lights might still be on from the architectural control system and how to manage these conflicts, etc.
7) How to shut down the console and the lighting system.

b. Additional information examples for anyone who needs to do the following:
1) RDM protocol and implementation, how to alter fixture DMX parameters via RDM, etc.
2) Patch lights and dimmers, including RDM functions. This should include what to do when a fixture won't RDM properly.
3) How to create a lighting cue and edit timing, etc.
4) How to load faders and sub masters.
5) How to save a show to USB.
6) How to load a show from USB.
7) Patching and grouping – how and why to use groups.
8) Color and focus functions – how and why to use.
9) Differences in color gamut between manufacturers of LED's.

C. Video recording general requirements (applies to all training & for record videos):

1. Static shots: The video recording device (camera, tablet and/or phone) must be placed on a tripod or other fixed stand, situated on a stable base and remain in a location that offers a good view of the rigging system, locking rail, arbors and any related equipment or controls being discussed. Handheld video recording of static scenes shall be avoided.
2. Roaming shots: The video recording device must employ motion stabilization (smart device app, post-production stabilization software or physical gimbal, etc.). Shaky, blurry videos shall not be acceptable.
3. Lighting: The lighting must be consistent (training space must be well lit without interruption-supplementary video lighting may be required). Lighting must be adequate for the video recording device and so that final video presentation appears professionally lit and dim/dark views of equipment are avoided. Provide portable lighting as needed to accomplish this.
4. Audio: The audio must be clear throughout (supplementary/advanced micing techniques may need to be utilized), there must be no other noises on the video that mask the verbal communications (HVAC noises, whines, hums, equipment crashing, the use of any construction equipment or power tools, off camera voices, etc. Audio must be recorded so that the trainer's words are clear, are not muffled, so that vocals do not trail off and so all spoken portions of the training videos are easily understandable.
5. Shot Composition: The video recording device must be pointed at the elements/objects being discussed (showing devices, screen shots, etc.). Utilize good framing techniques, close-ups as required and overall generalized shots where appropriate.
6. Topics & Viewability: The topics explored and trained on in the video trainings must be clear, consistent and of value. Text on screens must be readable, so close-up shots will be required when discussing certain elements (especially when discussing user interface screens, touch controls, etc.).

7. Typically, the video recording should be performed by a person other than the one doing the actual training. In this way, the operator can zoom to specific areas being discussed, etc. while the trainer continues presenting.
8. Editing/Final Presentation: All video recordings must be professional throughout from trainer presentation to video editing and final packaging. Video footage must be obtained and then “cut” together into a well-structured, chaptered format from which an owner can access whichever topic of interest or concern they may have without having to view or fast-forward through other discussions. Video edits should not end or cut off mid-sentence. Edit and title the final video training sessions into logical chapter format. The basis for titles, sections, chapters, etc. shall be the general content of the included equipment.
9. The intent of training videos is for an end user to be able to watch these and to follow along with button pushes, menu choices, etc.; therefore, the videos cannot be shot in a manner where the trainer’s body blocks major parts of the screen or where the trainer’s back is turned towards the camera and hearing/understanding the trainer is difficult and distant or where screens/buttons cannot be read. In order to allow an end user a clear understanding of system training, additional video may need to be shot by the contractor and edited into the final product with picture-in-picture style or split screen style editing where close up shots are easily readable.
10. The trainer/presenter for each session (especially for the secondary training section videos) must be articulate, speak clearly, properly enunciate his words and professionally present the information in a clear, concise and easily understood manner.
11. Convert each recording to standard formats for playback on Mac/PC based platforms and write to the devices as described below.
12. Provide all training videos on USB stick formats.
13. On the USB stick, include a PDF document that contains all relevant links to the manufacturer’s video training series for basic, intermediate and advanced topics/functions. Where manufacturer videos are available, provide these and/or the active links to these videos on the manufacturer’s website and/or other relevant sites (YouTube) for the owner’s future use and reference.
14. In subsequent advanced training sessions with the owner’s personnel, higher level functions may be covered. Some owners will not require this, but others will. The contractor is not required to video record subsequent sessions. The owner can record any session they want for future reference using their own equipment.
15. Pre-recorded videos for some training sessions that are “canned” but appropriate for the equipment located in this facility are completely acceptable and need not be custom done for/at each and every facility; however, they must be custom compiled into a framework that fits all equipment in the owner’s facility and must also include the initial training session(s) video footage.

D. Provide (1) one copy (brand new and not previously used) of Stage Lighting: The Technicians’ Guide: An On-the-job Reference Tool with Online Video Resources (provide the latest edition) by Skip Mort. This book shall remain with the owner as a reference manual.

3.20 FOLLOW-UP TRAINING SESSIONS:

A. Follow-up sessions should be recorded on video for record only, except as noted elsewhere, and copies provided for the owner’s records. These sessions are not to be confused with either initial or secondary system training intents.

B. Follow-up sessions may include a re-presentation of any previous session’s subject matter for a different group of end users or as a refresher to previously trained individuals.

C. Often these sessions will be used for in-rehearsal or show sessions where the contractor is an advisor to the end users/operators during actual show setup and/or system use for the first performance with the new equipment. These sessions do not need to be videoed and/or recorded.

3.21 SIGNAGE:

A. A sign shall be posted in an accessible location (typically on the rack(s) or in the control booth) providing the name, address and phone number of the primary system contractor, manufacturer and supplier (if not already listed) of the system equipment.

3.22 WARRANTY AND SERVICE:

A. The contractor guarantees all equipment, materials (excepting incandescent lamps) and workmanship to be free from defects for a period of one year from owner acceptance. This warranty supersedes all manufacturers warranties for the one-year period. Any manufacturer's warranty that exceeds the one-year will continue to be applicable. The contractor will replace any defective materials at no charge to owner. Any equipment replaced during the one-year warranty will have a new one-year warranty to the owner.

B. The contractor guarantees all labeling to be free from defects for a period of two years from the date of owner acceptance. In cases where the label's adhesive fails or the label suffers from degradation causing it to become unreadable, the label will be considered defective and will be replaced at no cost to the owner.

C. LED Fixtures and lamps that fail in the first 90 days will be replaced at no cost unless an electrical fault can be shown to have caused a major lamp outage or fixture failures.

D. The contractor will respond by phone to requests for service within 2 business hours and respond with a technician being sent (if needed) within 1 business day.

E. Any equipment that tends to "drift" or whose performance deteriorates during the warranty period will be considered defective, even if such drifting is normal during break in. This equipment will be readjusted by the contractor at no additional charge to the owner.

F. Provide all service at the owner’s location regardless of any manufacturer warranty terms regarding carry in service.

G. During the warranty period if any equipment failed will take more than 24 hours to repair, the contractor will make available and interconnect at no cost to the owner suitable temporary equipment to maintain a fully operational system until repairs are complete.

3.23 DEMONSTRATION AND ACCEPTANCE:

A. CONDITIONS FOR SCHEDULING FINAL ACCEPTANCE:

1. The system is required to be complete and fully tested. Any failure that may have occurred between the contractor's final tests and the date of acceptance will be noted and can be corrected after that date
   a. Final setup for the houselighting system must be scheduled so that the owner or owner’s representative, consultant, contractor and factory technician are all present. This will also constitute the final acceptance meeting for the houselighting system and all related preset setups. A factory technician must be present at this time or no final setup or final acceptance will be performed. If the factory technician has to return for this meeting, it will be at no additional charge to the owner.

B. PROCEDURE FOR SCHEDULING FINAL ACCEPTANCE:

1. The contractor shall notify the owner and consultant of a proposed date and time for the final acceptance tests. The contractor shall include two alternate dates and times. The dates proposed will be a minimum of fourteen (14) calendar days from the date of the proposal.

2. If none of the dates and times are acceptable, the owner and/or consultant will submit two alternate dates and/or times to the contractor.

C. DATE OF TESTS:

1. Sufficient personnel will be on hand so that final focus/adjustments can be made to the lighting fixtures.

2. The contractor will have the appropriate equipment available to focus/adjust the lights (for example, ladder, manlift, etc.).

3. Tools must be on hand to remove connector plates and provide for other possible inspections.

4. All racks must be able to be opened for inspection.
5. Documentation for all wiring must be completed in at least a neat draft form and on site. This must include as built nomenclature and wiring schedules.

6. The contractor will demonstrate operation of all major components of the systems including, but not limited to, the following:
   a. Demonstrate all system functions and presets.
   b. Demonstrate programming input.
   c. Demonstrate operations of all devices with the lighting console.
   d. Demonstrate that all fixtures and circuits are fully functional.
7. Any time required resolving any of the above conditions will be billed by the consultant at the rate of $100.00 per hour to be deducted from the contractor's remaining balances with the owner. Any time waiting for the contractor to set up test equipment or locate microphones or other required equipment will be billed at the same rate and in the same manner.
8. Any return trips to correct any of the above conditions will be wholly billed to the contractor and deducted from the contractor's remaining balances with the owner at the same rate.

3.24 CONDITIONS OF ACCEPTANCE:

A. It is understood that the consultant cannot inspect every aspect of the installation. The contractor is responsible for installation quality and methods, fabrication quality and methods, and performance of their work. Acceptance of the project will constitute an acceptance of the following:

B. All specified equipment is installed, and the system is operating in an acceptable manner from a functional standpoint (See checklist below for specific functional requirements).

C. Upon completion and acceptance of the project the contractor will provide to the owner a letter stating that all of the equipment and installation methods meet or exceed the specification requirements in all respects, and that the system as installed meets all of the applicable standards and codes required under the specification and meets applicable federal, state and local codes and laws.

D. ACCEPTANCE TESTS CHECKLIST:

1. Prior to acceptance testing there are a number of conditions that need to be verified. There are also site conditions required for the consultant to perform tests as indicated. The contractor shall ensure that every item on this checklist has been performed and verified prior to the consultant's acceptance tests can begin. Scheduling of the consultant to perform final acceptance tests must be coordinated with the owner, the project's construction manager (or clerk of the works), the contractor and the consultant (See paragraphs above for detailed requirements).

2. GENERAL
   a. No other contractors may be working within the rooms to be tested during tests.
   b. No rehearsals or other activities may take place during tests.
   c. The contractor must verify these conditions can be maintained during testing.

3. THEATRICAL LIGHTING – TYPICALLY TAKES 3 – 4 HOURS:
   a. Required attendance – A technician fully capable of programming and operation on all software including the console, architectural controls and any other software must be on site. Personnel and equipment needed for focus also need to be on site.
   b. Any remote programming software that requires an external computer to address the lighting system must be on site, on line and loaded into a laptop provided by the contractor and ready for use if system programming changes are required.
   c. All lighting circuits tested and verified. Have factory test report available on site.
   d. Lighting control console set up, monitors in place and on mounts and all cabling and interconnections complete and neatly dressed.
   e. All lighting console patching including color and any moving lights must be complete.
   f. Architectural presets and control patching complete.
   g. LCD screens completely programmed, mirror images of each other and fully functional, including password protection, astrological clocking functions, etc.
   h. All lighting system labeling complete, including wire management, yoke and fixture labeling, portable cabling, etc.
   i. All nodes and DMX distribution completely programmed and patched.
   j. Verification, in the form of signed documents, that all portable equipment has been delivered to the owner per specs and drawings and stored as per the owner's instructions. Portable equipment must be available for visual inspection as well.
   k. Network configuration software set up and fully programmed.

4. HOUSELIGHTING – TYPICALLY TAKES 1 – 2 HOURS:
   a. All houselighting circuits operational, all fixtures aimed and focused properly, all incandescent houselighting dimmers set to 95%, all houselighting presets programmed with the required fade up/fade down time, etc.
   b. All LED houselighting circuits operational, all fixtures aimed and focused properly, all LED houselighting fixtures set to 80%, all houselighting presets programmed with the required fade up/fade down time, etc.
   c. Emergency power sources available and tested. All related loads verified.

3.25 CLOSEOUT DOCUMENTATION:

A. All closeout documentation, including training videos, must provide the owner with usable content. The determination of acceptability will be determined by the Consultant. Poor quality training videos and documents will be rejected.

B. Closeout Documentation is to be submitted within two weeks of system completion.

C. Contractor must submit the following items. All items should be part of the O&M Manual. Provide the quantity and form (paper and/or electronic) of these closeout documents as is indicated in the contract front-end documentation. Physical copies shall only be required if front-end documentation requires them.

D. System testing documentation as required by final testing and acceptance procedures outlined in this document.

1. ALL paper copy O&M Manual submissions shall be in heavy-duty, D-Ring style, 3-Ring binders All electronic copies shall be “bound” in an Adobe Acrobat style portfolio (see below for more complete information).

2. Complete technical manuals for all equipment installed.

3. List of serial numbers of all equipment installed

4. Warranty cards for all equipment.

5. Manufacturer MSDS sheets for all applicable equipment.

6. Operations & Maintenance Manuals shall include English and Spanish only.

7. Operations & Maintenance Manual: An operations and maintenance manual (or “Systems Manual”) written in English on the safe use of a that particular site’s lighting, dimming and controls system(s) shall be provided by the contractor to the owner. (provide separate manual sections for different spaces included in this project – each to be a separate, complete and distinct section in the manual for each differing or multiple system and location). This manual should include the following:
   a. Table of contents.
   b. A contractor written simplified guide to operating the system Include at minimum:
      1) A contractor written simplified troubleshooting guide or what to check and where to check if no lights will come on. Provide this in a 2-column style format.
      2) How to power up and power down the console, lighting system, etc.
      3) Console touch screen set up and general info on how to access various screens.
      4) A key stroke guide on how to quickly get to menus to patch dimmers, RDM fixtures, address/patch LED’s or other moving/specialty lights and accessories to the console.
      5) Constructing and editing cues.
      6) Programming sub masters.
      7) Loading Faders.
      8) How to perform file saves, file loads, etc.
      9) A short list of the required software reset procedures for all lighting system related subsystems.

c. A simplified guide to operating the architectural control system, an understanding of pile on system architecture and where the button stations get their content. If editing has been made available on LCD screens, provide a guide on how to save over presets that affect button stations.
d. Microsoft Excel spreadsheets of all initial lighting system patch data, DMX assignments and fixture types at final set up.
e. Emergency contact number(s) and procedures to follow in the event of a catastrophic system failure.
f. One copy of the "Workbook" version of each of the following training guides used (only provide for levels trained on):
    1) ETC Level 1 console training – Essentials.
    2) ETC Level 2 console training – Enhanced Skills.
    3) ETC Level 3 – Advanced Programming.
g. Maintenance procedures and recommended schedules required for equipment installed that requires regular scheduled maintenance.
h. A DVD (or set of DVDS, depending on requirements listed Under Training Sections above) and a USB thumb drive with all content included on it.

E. O&M Manual pdf requirements: The contractor shall provide a pdf copy (with appropriate titles) for each piece of documentation listed above and bound together in a pdf portfolio/binder, labeled with the owner's name and with the submitting contractor's information. All electronic manuals shall contain only equipment and information that pertains to the project. Where factory manuals are available the contractor shall provide these. Where factory manuals are not available, the contractor shall provide high resolution (150 dpi minimum and fully optimized in Acrobat or equal), full page, properly and consistently oriented pages in a consecutive ascending order. All pdf portfolio and binders produced and submitted shall be professionally put together and presented well. All manuals shall be saved as standard Adobe Portable Document Format (PDF).

END OF SECTION

SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Stencils.

D. Pipe markers.

E. Ceiling tacks.

1.2 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Schedules:
   1. Submit plumbing component identification schedule listing equipment, piping, and valves.
   2. Detail proposed component identification data in terms of of wording, symbols, letter size, and color coding to be applied to corresponding product.
   3. Valve Data Format: Include id-number, location, function, and model number.

C. Operation and Maintenance, O&M, Manual Data: Record actual locations of tagged valves, and provide laminated valve chart which includes valve tag numbers, location and function in chart form for placement into Operations and Maintenance Manual.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

A. Pipe Markers: 3/4 inch diameter and higher.

2.2 NAMEPLATES

A. Description: Laminated piece with up to three lines of text.
   1. Letter Color: White.
   2. Letter Height: 1/4 inch.
   3. Background Color: Black.

B. Generator Gas Shutoff Valve: 2 inch by 4 inch, engraved yellow anodized aluminum with rounded corners and 1/4 inch text for exterior use. Nameplate to read "GENERATOR GAS

SHUTOFF VALVE - DO NOT TURN OFF". Nameplate to be secured with brass chains. Nameplate available from Craftmark Pipe Markers or Equivalent.

C. Main Gas Shutoff Valve: 2 inch by 4 inch, engraved yellow anodized aluminum with rounded corners and 1/4 inch text for exterior use. Nameplate to read "BUILDING GAS SHUTOFF VALVE - NOT GENERATOR SHUTOFF". Nameplate to be secured with brass chains. Nameplate available from Craftmark Pipe Markers or Equivalent.

2.3 STENCILS (CONCEALED PIPING)

A. Stencil Paint: As specified in Section 09 91 23, semi-gloss enamel, colors complying with ASME A13.1.

2.4 PIPE MARKERS (EXPOSED PIPING)

A. Comply with ASME A13.1.

B. Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.

C. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

D. Identification Scheme, ASME A13.1:
1. Primary: External Pipe Diameter, Uninsulated or Insulated.
2. Secondary: Color scheme per fluid service.
a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

2.5 CEILING TACKS

A. Description: Steel with 3/4 inch diameter color coded head.

B. Color code as follows:
1. Plumbing Valves: Green.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive identification products.

B. Prepare surfaces for stencil painting, see Section 09 91 23.

3.2 INSTALLATION

A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags in clear view and align with axis of piping

C. Identify water heaters, pumps, tanks, and water treatment devices with plastic nameplates. Identify in-line pumps and other small devices with tags.

D. Apply stencil painted identification in compliance with Section 09 91 23 requirements. Identify unit with assigned id-number and area being served using pipe marking rules.

E. Install plastic pipe markers in accordance with manufacturer's instructions.
1. Identify service, flow direction, and pressure.

2. Install in clear view and align with axis of piping.
3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

F. Locate ceiling tacks to locate valves above lay-in panel ceilings. Locate in corner of panel closest to equipment.

G. Identify concealed piping, with stenciled painting. Identify exposed piping with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

H. Identify valves in main and branch piping with tags.

END OF SECTION

SECTION 22 07 19
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Expanded polystyrene insulation.

B. Flexible elastomeric cellular insulation.

C. Glass fiber insulation.

D. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 09 91 23 - Interior Painting: Painting insulation jacket.

C. Section 22 10 05 - Plumbing Piping and Specialties: Placement of hangers and hanger inserts.

D. Section 22 05 53 - Identification for Plumbing Piping and Equipment.

1.3 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019.

B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).

C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).

D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.

E. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017.

F. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.

G. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.

H. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).

I. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.

J. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2019a.

K. ASTM C610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation; 2017.

L. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber; 2014.

M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

N. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

O. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Maintain ambient conditions required by manufacturers of each product.

C. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER INSULATION

A. Manufacturers:
1. Armstrong

B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. K Value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum Service Temperature: 850 degrees F.
   3. Maximum moisture absorption: 0.1 percent by volume.

C. Vapor Retarder Jacket: ASTM C1136 Flexible, Low Permeance Vapor Retarders for Thermal Insulation, Type II. Facing: 1 inch galvanized steel hexagonal wire mesh stitched on one face of insulation.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

2.3 EXPANDED POLYSTYRENE INSULATION

A. Manufacturers:
   1. Armstrong.
   2. Certainteed Company.
   3. Manville Products
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation: ASTM C578; rigid closed cell.
   1. K Value: 0.23 at 75 degrees F.
   2. Maximum Service Temperature: 165 degrees F.
   3. Maximum Moisture Absorption: 0.2 percent by volume.
   4. Maximum Water Vapor Permeance: 5.0 perm inch.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:
   1. Armstrong
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.

2.5 JACKETING AND ACCESSORIES

A. PVC Plastic Pipe Jacket.
   1. Manufacturers:
      a. Armstrong.
      b. Owens Corning.
      c. Knauf.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Maximum Service Temperature: 450 degrees F.
      b. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      c. Thickness: 15 mil.
      d. Connections: Brush on welding adhesive.
   3. Covering Adhesive Mastic: Compatible with insulation.
   4. Insulation covering cold water systems shall contain integral vapor retarder system for moisture removal and mold prevention.

B. Aluminum Jacket:
   1. Thickness: 0.020 inch sheet.
   2. Finish: Embossed.
   3. Joining: Longitudinal slip joints and 2 inch laps.

4. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

H. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

I. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert Location: Between support shield and piping and under the finish jacket.
   4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

L. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

M. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

N. Provide insulation to storm piping in its entirety from roof drain, entire length of horizontal storm piping run to main vertical drop.

3.3 SCHEDULES

A. Plumbing Systems:
1. All sizes of Domestic Cold water, 1/2 inch to 1-1/4 inch Hot Water, 1/2 inch to 1-1/4 inch Hot Water Recirculation and 1/2 inch to 1-1/4 inch Tempered Water Piping:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1 inch.
   b. Cellular Glass Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1 inch.
   c. Expanded Polystyrene Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1 inch.
   d. Cellular Foam Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1 inch.
2. 1-1/2 inch and Larger Domestic Hot Water, Hot Water Recirculation and Tempered Water Piping:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1-1/2 inch.
   b. Cellular Glass Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1-1/2 inch.
   c. Expanded Polystyrene Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1-1/2 inch.
   d. Cellular Foam Insulation:
      1) Pipe Size Range: As Noted.
      2) Thickness: 1-1/2 inch.
3. Roof Drain Bodies:
   a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
   b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
   c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.
4. Exposed Roof Drainage Above Grade
   a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
   b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
   c. Cellular Glass Insulation with full PVC jacket. All pipe sizes, 1 inch thick.
5. Concealed Roof Drainage

a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.

6. Roof Drainage Run Horizontal at Roof Level:
   a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
   b. Elastomeric Cellular Foam Insulation. All pipe sizes, 1 inch thick.
   c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.
7. Plumbing Vents Within 10 Feet of the Exterior:
   a. Fiber Glass Insulation with integral vapor retarder. All pipe sizes, 1 inch thick.
   b. Elastomeric Cellular Foam Insulation all pipe sizes, 1 inch thick.
   c. Cellular Glass Insulation. All pipe sizes, 1 inch thick.

B. Plumbing Systems:
1. Domestic Hot Water Storage Tanks:
   a. Cellular Glass Insulation: 2 inches thick.
2. Domestic Cold Water Storage Tanks:
   a. Cellular Glass Insulation: 2 inches thick.
3. Piping Exposed to Freezing with Heat Tracing: All pipe sizes, 1 inch thick.

END OF SECTION

SECTION 22 10 05
PLUMBING PIPING AND SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sanitary waste piping, buried within 5 feet of building.

B. Pipe, pipe fittings, valves, connections and specialties for:
   1. Sanitary sewer systems.
   2. Domestic water systems.
   3. Storm water systems.
   4. Gas systems.
   5. Flanges, unions, and couplings.
   6. Pipe hangers and supports.
   7. Manufactured sleeve-seal systems.
   8. Ball valves.
   9. Butterfly valves.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 22 05 53 - Identification for Plumbing Piping and Equipment.

C. Section 22 07 19 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems; 2015.

B. ANSI Z223.1 - National Fuel Gas Code; 2016.

C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.

E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.

F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV; 2016.

G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.

H. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV; 2017.

I. ASME B31.9 - Building Services Piping; 2017.

J. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2019.

K. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.

L. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems; 2009.

M. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

N. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2017.

O. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2019.

P. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

Q. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2015a.

R. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2011.

S. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2011.

T. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.

U. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.

V. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV); 2013.

W. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2014.

X. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012 (Reapproved 2018).

Y. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.

Z. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.

AA. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2016.

AB. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

AC. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe; 2014.

AD. ASTM F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings; 2016.

AE. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2010.

AF. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2017.

AG. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2017, with Errata (2018).

AH. AWWA C550 - Protective Interior Coatings for Valves and Hydrants; 2017.

AI. AWWA C651 - Disinfecting Water Mains; 2014.

AJ. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; 2017.

AK. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2017 (Revised 2018).

AL. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2012 (Revised 2018).

AM. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.

AN. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.

AO. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.

AP. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.

AQ. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.

AR. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends; 2018.

AS. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.

AT. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends; 2011.

AU. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

AV. NSF 61 - Drinking Water System Components - Health Effects; 2019.

AW. NSF 372 - Drinking Water System Components - Lead Content; 2016.

AX. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, hangers, supports and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

D. Project Record Documents: Record actual locations of valves.

E. Hangers and Supports: Submit manufacturers catalog information including load capacity.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements for additional provisions.
   2. Valve Repacking Kits: One for each type and size of valve.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Perform Work in accordance with standards of the State of New York.

C. Valves: Manufacturer's name and pressure rating marked on valve body.

D. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.

E. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

F. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for installation of backflow prevention devices.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.8 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 extra heavy weight.
   1. Fittings: Cast iron.
   2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

B. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. Copper Tube: ASTM B306, DWV, Type L.
   1. Fittings: ASME B16.29, wrought copper, or ASME B16.23, sovent.
   2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.

C. PVC Pipe - (Not For Use in Return Air Plenums or Exposed in Places of Assembly.): ASTM D2665.
   1. Fittings: PVC.

2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tubing for pipe 2 1/2 inches and smaller: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H)
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B 32, alloy Sn95 solder. Lead free.

B. Copper Tubing for pipe 3 inches and larger: ASTM B88, Type L (B), hard drawn, rolled grooved ends
   1. Fittings: ASTM B584 bronze sand castings, grooved ends.
   2. Joints: Grooved mechanical couplings meeting ASTM F1476.
      a. Housing Clamps: ASTM A395/A395M and ASTM A536 ductile iron, enamel coated, compatible with copper tubing sizes, to engage and lock designed to permit some angular deflection, contraction, and expansion.
      b. Gasket: Elastomer composition for operating temperature range from -30 degrees F to 180 degrees F.
      c. Accessories: Stainless steel bolts, nuts, and washers.
   3. Mechanically pressed fitting are allowed for this application.

2.5 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 service weight, bell and spigot ends.
   1. Fittings: Cast iron, ASTM A74.
   2. Joint Seals: ASTM C 564 neoprene gaskets.

B. PVC Pipe: ASTM D2665 or ASTM D3034, polyvinyl chloride (PVC) material.
   1. Fittings: PVC, ASTM D2665 or ASTM D3034.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.6 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe (Not For Use in Return Air Plenums or Exposed in Places of Assembly.): ASTM D2665 or ASTM D3034.
   1. Fittings: ASTM D2665 or ASTM D3034, PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.7 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
   2. Joints: NFPA 54, Threaded for pipe size 2-1/2" inch and smaller and welded for pipe size 3 inch and larger to ASME B31.1.
   3. Exterior gas piping above grade:
      a. Apply one coat of rust inhibitive primer paint and one finish coat of paint per manufacturer’s recommendation. Rust preventive enamel, OSHA approved. Color to be coordinated with Owner.

2.8 ROOF DRAINS

A. Retrofit Roof Drain:
   1. Assembly: ASME A112.21.2M.
   2. Body: #16 gage Type 304 stainless steel.

3. Strainer: Removable aluminum dome.
4. Accessories: Coordinate with roofing type:
   a. Membrane flange and membrane clamp with integral gravel stop.
   b. Roof sump receiver.
   c. Waterproofing flange.
   d. Controlled flow weir.
   e. Leveling frame.
   f. Perforated or slotted ballast guard extension for inverted roof.
   g. Perforated stainless steel ballast guard extension.
   h. Dura-Coated cast iron clamp collar.
   i. Stainless steel hardware.
   j. Neoprene gasket.

2.9 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 2 inches and Under:
   1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
   2. PVC Piping: PVC
   3. CPVC Piping: PVC

B. Flanges for Pipe Size Over 2 inches:
   1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
   3. PVC Piping: PVC
   4. CPVC Piping: PVC
   5. Gaskets: 1/16 inch thick preformed neoprene gaskets

2.10 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.

B. Plumbing Piping - Drain, Waste, and Vent:
   1. Conform to ASME B31.9.
   2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
   3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
   6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
   7. Vertical Support: Steel riser clamp.
   8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:
   1. Conform to ASME B31.9.
   2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
   3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

4. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded supports or spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

E. INSERTS
1. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

F. FLASHING
1. Metal Flashing: 26 gage thick galvanized steel.
2. Metal Counterflashing: 22 gage thick galvanized steel.
3. Lead Flashing:
   a. Waterproofing: 5 lb./sq. ft sheet lead.
   b. Soundproofing: 1 lb./sq. ft sheet lead.
4. Flexible Flashing: 47 mil thick sheet compatible with roofing.
5. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

G. SLEEVES
1. Sleeves for Pipes through Non-fire Rated Floors: 18 gage thick galvanized steel.
2. Sleeves for Pipes through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
3. Sealant: refer to Section 07 92 00.

H. MECHANICAL SLEEVE SEALS
1. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

I. FORMED STEEL CHANNEL
1. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

J. FIRESTOPPING
1. Refer to Specification Section 07 84 00.

2.11 MANUFACTURED SLEEVE-SEAL SYSTEMS

A. Modular/Mechanical Seal:
   1. Synthetic rubber interlocking links continuously fill annular space between pipe and wall/casing opening.
   2. Provide watertight seal between pipe and wall/casing opening.
   3. Elastomer element size and material in accordance with manufacturer's recommendations.
   4. Glass reinforced plastic pressure end plates.

2.12 BALL VALVES

A. Manufacturers:
   1. Substitutions: See Section 01 60 00 - Product Requirements.

B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle, solder or threaded ends with union. Lead free.

2.13 HORIZONTAL SWING CHECK VALVES

A. Up to 2 Inches:
   1. MSS SP-80, 150, bronze body and cap, bronze swing disc with rubber seat, solder or threaded ends. Lead free.

2.14 SPRING LOADED CHECK VALVES

A. Up to 2 inches:
   1. MSS SP 80, Class 250, bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, threaded ends. Lead free.

B. 2-1/2 inches and Larger:

C. MSS SP 71, Class 125, wafer style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

2.15 WATER PRESSURE REDUCING VALVES

A. Up to 2 Inches:
   1. MSS SP-80, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded single union ends. Lead free.
   2. Provide pressure gauge onto inlet side and outlet side piping of valve.

B. Over 2 Inches:
   1. ASSE 1003, cast iron body with interior lining complying with AWWA C550, bronze fitted, elastomeric diaphragm and seat disc, flanged.
   2. Provide pressure gauge onto inlet side and outlet side piping of valve.

2.16 WATER HAMMER ARRESTOR -LEAD FREE

A. Stainless steel bellow type, complies with and sized in accordance with PDI WH-201.

B. Pre-charged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

2.17 THERMOSTATIC MIXING VALVE

A. Valve: Chrome plated cast brass body, stainless steel or nickel plated bellows, integral temperature adjustment.

B. Accessories:
1. Check valve on inlets.
2. Volume control shut-off valve on outlet.
3. Stem thermometer on outlet.
4. Strainer stop checks on inlets.

C. Cabinet: 16 gage enameled steel, for surface mounting with keyed lock.

2.18 FLOOR DRAIN / FLOOR SINK

A. Floor Drain, FD-1: ASME A112.21.1; cast iron two piece body with double drainage flange, weep holes, 1/2 inch trap primer connection, reversible clamping collar, and round adjustable nickel-bronze strainer.

B. Floor Drain / Floor Sink Trap Primer Valve: ASSE 1018, corrosion resistant brass, piston operated, no springs or diaphragms, adjustable in line pressure, 1/2 inch inlet and outlet openings.

2.19 CLEANOUTS

A. Cleanout, Interior Finished Floor Area, CO-1: cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round polished bronze scoriated cover.

B. Cleanout, Interior Unfinished Inline Accessible Area, CO-2: cast iron body ferrule type with ABS countersunk plug.

C. Wall Cleanout, Interior Finished Wall Area, WCO-1: cast iron body with lacquered ABS tapered threaded plug and round stainless steel wall access cover with securing screw.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly. Protect open ends with temporary plugs or caps.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not exposed.

H. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.

J. Install bell and spigot pipe with bell end upstream.

K. Install valves with stems upright or horizontal, not inverted.

L. Install water piping to ASME B31.9.

M. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

N. Sleeve pipes passing through partitions, walls, and floors.

O. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

P. PVC piping is not allowed to be installed in places of assembly, plenum spaces, exit discharge corridors or stairs. Use cast iron or copper piping in these locations.

Q. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.

R. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to fixtures to prevent hammer or install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or 3/4 inch minimum, and minimum 18 inches long.

S. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

T. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   8. Provide copper plated hangers and supports for copper piping.

9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
10. Support cast iron drainage piping at every joint.

U. Pipe Sleeve-Seal Systems:
1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
3. Locate piping in center of sleeve or penetration.
4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
5. Tighten bolting for a watertight seal.
6. Install in accordance with manufacturer's recommendations.

V. Equipment Bases and Supports
1. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment. Refer to Section 03 30 00.
2. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
3. Construct supports of steel members or formed steel channel. Brace and fasten with flanges bolted to structure.

W. Flashing
1. Provide flexible flashing and metal counterflashing where piping penetrates weather or waterproofed walls, floors, and roofs.
2. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked 1 inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal.
3. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.
4. Seal floor, shower, and mop sink drains watertight to adjacent materials.
5. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

X. Sleeves
1. Set sleeves in position in forms. Provide reinforcing around sleeves.
2. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
3. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.
4. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fire stopping, insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
5. Install chrome plated steel escutcheons at finished surfaces.

3.4 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install globe valves for throttling, bypass, or manual flow control services.

3.5 TOLERANCES

A. Sanitary Drainage Piping: Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum on mains 4 inches and larger. Install branch mains smaller than 4 inch with 1/4 inch per foot minimum.

B. Storm Drainage Piping: Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Final water samples shall be sent to a State Department of Health approved testing lab in the State of New York and sample test results shall be submitted to A/E of record.

B. Prior to starting work, verify system is complete, flushed, and clean.

C. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

D. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

E. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

F. Maintain disinfectant in system for 24 hours.

G. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

H. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

I. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.7 SERVICE CONNECTIONS

A. Test sanitary waste, vent piping and storm drainage system in accordance with Plumbing Code of the State of New York.

B. Test domestic water piping system in accordance with Plumbing Code of the State of New York.

C. Test 1/2 psi gas piping system at 10 psi for one hour in accordance with Fuel Gas Code of the State of New York and New York State SED Manual of Planning Standards.

3.8 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe Size: 1/2 inches to 1-1/4 inches:
         1) Maximum Hanger Spacing: 6.5 ft.
         2) Hanger Rod Diameter: 3/8 inches.
      b. Pipe Size: 1-1/2 inches to 2 inches:
         1) Maximum Hanger Spacing: 10 ft.
         2) Hanger Rod Diameter: 3/8 inch.
      c. Pipe Size: 2-1/2 inches to 3 inches:
         1) Maximum Hanger Spacing: 10 ft.
         2) Hanger Rod Diameter: 1/2 inch.
      d. Pipe Size: 4 inches to 6 inches:

1) Maximum Hanger Spacing: 10 ft.
2) Hanger Rod Diameter: 5/8 inch.

2. Cast Iron (All Sizes) pipe length less than 10':
   a. Maximum hanger Spacing: 5 ft.
   b. Hanger rod diameter: 5/8 inch
3. Cast Iron (All Sizes) with 10 foot length of pipe
   a. Maximum hanger Spacing: 10 ft.
   b. Hanger rod diameter: 5/8 inch
4. CPVC, 1 inch and smaller
   a. Maximum hanger Spacing: 3 ft.
   b. Hanger rod diameter: 1/2 inch
5. CPVC, 1-1/4 inches and larger
   a. Maximum hanger Spacing: 4 ft.
   b. Hanger rod diameter: 1/2 inch
6. Copper Tube, 1-1/4 inches and smaller
   a. Maximum hanger Spacing: 6 ft.
   b. Hanger rod diameter: 1/2 inch
7. Copper Tube, 1-1/2 inches and larger
   a. Maximum hanger Spacing: 10 ft.
   b. Hanger rod diameter: 1/2 inch
8. PVC (All Sizes)
   a. Maximum hanger Spacing: 4 ft.
   b. Hanger rod diameter: 3/8 inch

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush valve water closets.

B. Wall hung urinals.

C. Wall-hung, solid surface, multi-station lavatory units.

D. All-in-one lavatory system.

E. Sinks.

F. Under-lavatory pipe supply covers.

G. Shower receptors.

H. Outdoor showers.

I. Electric water coolers.

1.2 RELATED REQUIREMENTS

A. Section 22 10 05 - Plumbing Piping and Specialties.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2013.

C. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).

D. ASME A112.18.1 - Plumbing Supply Fittings; 2018.

E. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2017).

F. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018.

G. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2017.

H. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2017.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

K. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

L. NSF 61 - Drinking Water System Components - Health Effects; 2019.

M. NSF 372 - Drinking Water System Components - Lead Content; 2016.

N. ARI 1010 - Self-Contained, Mechanically Refrigerated Drinking-Water Coolers

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements for additional provisions.
2. Flush Valve Service Kits: One for each type and size.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 REGULATORY REQUIREMENTS

A. Plumbing piping, joints, faucets, etc. must comply with the requirements, and bear the label indicating the materials comply with the definition of “lead free” requirement of the Environmental Protection Agency “Reduction of Lead in Drinking Water Act”.

B. Lead Water Testing: Lead water testing shall be conducted at all Lavatories, Sinks and Drinking Fountains in accordance with Public Health Law section 1370-a and 1110, Subpart 67-4 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York and the Environmental Protection Agency 3T’s for Reducing Lead in Drinking Water.

C. School District reserves the right to accept or not accept installation unless results are not greater than the Department Of Health action level.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Provide standard manufacturer warranty for Plumbing Fixtures.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 MANUFACTURERS:

A. Refer to Plumbing Fixture Schedule on drawing for Manufacturer, Model, Trim and Remarks.

2.3 FLUSH VALVE WATER CLOSETS

A. Water Closet Bowl (WC-2): ASME A112.19.2M; ADA compliant, wall mount, siphon jet, vitreous china closet bowl with elongated rim, 1-1/2 inch top spud and 1.28 gallon flush volume.

B. Water Closet Bowl (WC-1): ASME A112.19.2M; Wall mount, siphon jet, vitreous china closet bowl with elongated rim, 1-1/2 inch top spud and 1.28 gallon flush volume.

C. Flush Valve, Concealed Electric Powered Sensor Operated (WC-1,2): ADA compliant, concealed rough brass diaphragm type with solenoid operator with wall box with stainless steel access panel and vandal resistant screws. Adaptive infrared sensor and true mechanical over-ride button, stop seat, integral wheel handle stop, vacuum breaker and 1.28 gallon flush volume for use with 1-1/2 inch back spud.
   1. Electrical requirements:
      a. Refer to Plumbing Fixture Schedule on drawing.

D. Toilet Seats:
   1. Elongated solid white plastic, open front without cover, self-sustaining hinge, brass bolts.
   2. Elongated solid white seat and hinges, open front without cover, scalloped handhold for use with child floor mounted water closet.

E. Water Closet Carriers:
   1. ASME A112.6.1M; floor mounted, adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor attachment, threaded fixture studs with nuts and washers. For handicap and non-handicap wall mount water closets.

F. Water Closet Accessories:
   1. Toilet mounting flange, bowl ring, mounting hardware, bolt caps. For handicap and non-handicap floor mounted water closets.

2.4 WALL HUNG URINALS

A. Urinal, (UR-1, UR-2): ASME A112.19.2; ADA compliant, wall mount, washout, vitreous china urinal with shields, integral trap, elongated 14 inch rim from finished wall, 3/4 inch top spud, steel supporting hanger and 0.50 gallon flush volume.

B. Flush Valve, Concealed Electric Powered Sensor Operated (UR-1,2): ADA compliant, concealed rough brass diaphragm type with solenoid operator with wall box with stainless steel access panel and vandal resistant screws. Adaptive infrared sensor, true mechanical over-ride button, integral wheel handle stop, vacuum breaker and 0.50 gallon flush volume for use with 3/4 inch back spud.
   1. Electrical requirements:
      a. Refer to Plumbing Fixture Schedule on drawing.

C. Urinal Carriers:
   1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor attachment, threaded fixture studs for fixture hanger, bearing studs. For handicap and non-handicap urinals.

2.5 WALL-HUNG, SOLID SURFACE, MULTI-STATION LAVATORY UNITS

A. Description: Rectilinear, level-surface deck, seamless and integral elongated basin.

B. Deck and Bowl Material: Fabricate from molded engineered stone material consisting of natural quartz, granite, and other minerals in a matrix of thermoset acrylic modified bio-based polyester resin and meeting requirements of IAPMO Z124.

C. Surface Burning Characteristics: Smoke developed index less than 450, and flame spread index less than 25, Class A, when tested in accordance with ASTM E84.

D. Number of Wash Stations: one, two or three, see schedule designation..

E. Soap Dispenser:

F. Color: As selected by Architect from manufacturer's full line.

G. Access Panel: Stainless steel.

H. Support Frame: Wall mounted, heavy gauge, stainless steel.

2.6 SINKS

A. Single Compartment Bowl: ASME A112.19.3; 19 x 21 x 5-1/2 inch outside dimensions, 18 gage thick, Type 304 stainless steel. Self-rimming and undercoated, with 1-1/2 inch stainless steel offset grid drain and tailpiece, transformer, thermostatic mixing valve and ledge back drilled, single hole, for trim.
   1. Trim: Deck mounted low lead content sensor faucet, 11-5/8 inch high spout with 2.20 gpm aerator, chrome plated finish.
   2. Accessories: Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon, screwdriver stop and rigid supplies.
   3. Electrical requirements:
      a. Refer to Plumbing Fixture Schedule on drawing.
      b. Transformer (Hard Wired): 120V AC Input / 12V AC Output / 300 mA Output Current.

2.7 UNDER-LAVATORY PIPE SUPPLY COVERS

A. General:
   1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
   2. Construction: 1/8 inch PVC with antimicrobial, antifungal and UV resistant properties.
      a. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
      b. Comply with ICC A117.1.

2.8 ELECTRIC WATER COOLERS

A. Water Cooler with Bottle Filler, (ECB-1): Lead-Free, ADA compliant Two-station, electric, mechanically refrigerated; surface handicapped mounted; stainless steel top, stainless steel body, elevated lead-free anti-squirt bubbler with stream guard, automatic stream regulator, push controls located in front, left and right side of unit, mounting bracket; integral air cooled condenser, cane apron. Body and lower shroud to be stainless steel. Bottle filler with filter and electronic sensor activation, plastic components, visual monitor for filter replacement. Provide 3-pack replacement filters.
   1. Capacity: Water Cooler - 8 gallons per minute of 50 degrees F water with inlet at 80 degrees F and room temperature of 90 degrees F, when tested in accordance with ASHRAE Std 18.
      Capacity: Bottle Filler - 1.1 - 1.5 gallons per minute of 50 degrees F water with inlet at 80 degrees F and room temperature of 90 degrees F.
   2. Electrical requirements:
      a. Refer to Plumbing Fixture Schedule on drawing.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Do not permit use of fixtures by construction personnel.

C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Stencils.

D. Ceiling tacks.

1.2 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Product Data: Provide manufacturers catalog literature for each product required.

E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

F. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Air Handling Units: Nameplates.

B. Air Terminal Units: Tags.

C. Automatic Controls: Tags. Key to control schematic.

D. Control Panels: Nameplates.

E. Dampers: Ceiling tacks, where located above lay-in ceiling.

F. Ductwork: Stencilled painting.

G. Major Control Components: Nameplates.

H. Piping: Tags.

I. Pumps: Nameplates.

J. Small-sized Equipment: Tags.

K. Tanks: Nameplates.

L. Thermostats: Nameplates.

M. Valves: Tags and ceiling tacks where located above lay-in ceiling.

N. Water Treatment Devices: Nameplates.

2.2 NAMEPLATES

A. Manufacturers:
   1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com/#sle.
   2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.
   4. Letter Color: White.
   5. Letter Height: 1/2 inch.
   6. Background Color: Black.

2.3 TAGS

A. Manufacturers:
   1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
   2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

D. Valve Tag Chart: Typewritten letter size list of applied tags and locations in plastic laminated frame.

2.4 STENCILS

A. Manufacturers:
   1. Brady Corporation: www.bradycorp.com/#sle.
   2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Stencils: With clean cut symbols and letters of following size:
   1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.
   2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
   3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
   4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.

5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
6. Ductwork and Equipment: 2-1/2 inch high letters.

C. Stencil Paint: As specified in Section 09 91 23, semi-gloss enamel, colors complying with ASME A13.1.

2.5 CEILING TACKS

A. Description: Steel with 3/4 inch diameter color coded head.

B. Color code as follows:
1. HVAC Equipment: Yellow.
2. Fire Dampers and Smoke Dampers: Red.
3. Heating/Cooling Valves: Blue.
4. Plumbing valves: Green

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 09 91 23 for stencil painting.

3.2 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Apply stencil painting in accordance with Section 09 91 23.

D. Install plastic pipe markers in accordance with manufacturer's instructions.

E. Install ductwork with stencilled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

F. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Testing, adjustment, and balancing of hydronic and refrigerating systems.

C. Measurement of final operating condition of HVAC systems.

D. Sound measurement of equipment operating conditions.

E. Commissioning activities.

1.2 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements: Employment of testing agency and payment for services.

B. Section 23 08 00 - Commissioning of HVAC.

1.3 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008 (Reaffirmed 2017).

C. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, with Errata (2017).

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Submit to Architect.
   2. Submit to the project engineer / Construction Manager.
   3. Submit six weeks prior to starting the testing, adjusting, and balancing work.
   4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
   5. Include at least the following in the plan:
      a. Preface: An explanation of the intended use of the control system.
      b. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.

d. Identification and types of measurement instruments to be used and their most recent calibration date.
e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
f. Final test report forms to be used.
g. Detailed step-by-step procedures for TAB work for each system and issue, including:
   1) Terminal flow calibration (for each terminal type).
   2) Diffuser proportioning.
   3) Branch/submain proportioning.
   4) Total flow calculations.
   5) Rechecking.
   6) Diversity issues.
h. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Field Logs: Submit at least once a week to project engineer / Construction Manager.

E. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

F. Progress Reports.

G. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Submit to the project engineer / Construction Manager within two weeks after completion of testing, adjusting, and balancing.
2. Revise TAB plan to reflect actual procedures and submit as part of final report.
3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
6. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

H. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

B. Maintain one copy of each document on site.

C. Prior to commencing Work, calibrate each instrument to be used.

1.7 QUALIFICATIONS

A. Agency: Company specializing in testing, adjusting, and balancing of systems specified in this section with minimum three years documented experience certified by AABC or Certified by NEBB.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

1.9 SEQUENCING

A. Section 01 10 00 - Summary: Work sequence.

B. Sequence balancing between completion of systems tested and Date of Substantial Completion.

1.10 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
1. AABC (NSTSB), AABC National Standards for Total System Balance.
2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
3. SMACNA (TAB).

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:
a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.

2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

3.3 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
   1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect and project engineer / Commissioning Authority to facilitate spot checks during testing.

3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 5 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:
   1. Running log of events and issues.
   2. Discrepancies, deficient or uncompleted work by others.
   3. Contract interpretation requests.
   4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

H. Check and adjust systems approximately six months after final acceptance and submit report.

3.6 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

I. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

L. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

M. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.7 WATER SYSTEM PROCEDURE

A. Adjust water systems to provide required or design quantities.

B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

D. Effect system balance with automatic control valves fully open to heat transfer elements.

E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.8 COMMISSIONING

A. See Section 23 08 00 for additional requirements.

B. Perform prerequisites prior to starting commissioning activities.

C. Furnish to the project engineer / Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.

D. Re-check minimum outdoor air intake flows and maximum and intermediate total airflow rates for 20 percent of the air handlers plus a random sample equivalent to 10 percent of the final TAB report data as directed by Commissioning Authority.
   1. Original TAB agency shall execute the re-checks, witnessed by the Commissioning Authority.
   2. Use the same test instruments as used in the original TAB work.
   3. Failure of more than 10 percent of the re-checked items of a given system shall result in the rejection of the system TAB report; rebalance the system, provide a new system TAB report, and repeat random re-checks.
   4. For purposes of re-check, failure is defined as follows:
      a. Air Flow of Supply and Return: Deviation of more than 10 percent of instrument reading.
      b. Minimum Outside Air Flow: Deviation of more than 20 percent of instrument reading; for inlet vane or VFD OSA compensation system using linear proportional control, deviation of more than 30 percent at intermediate supply flow.
      c. Temperatures: Deviation of more than one degree F.
      d. Air and Water Pressures: Deviation of more than 10 percent of full scale of test instrument reading.
      e. Sound Pressures: Deviation of more than 3 decibels, with consideration for variations in background noise.
   5. For purposes of re-check, a whole system is defined as one in which inaccuracies will have little or no impact on connected systems; for example, the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system.

E. In the presence of the Commissioning Authority, verify that:
   1. Final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked.
   2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.
   3. The water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full cooling the cooling coil valve of that leg is 90 percent or more open.

F. No seasonal tests are required.

G. No further monitoring is required.

H. No deferred testing is required.

3.9 SCOPE

A. Test, adjust, and balance the following:
1. Air Cooled Refrigerant Condensers.
2. Packaged Roof Top Heating/Cooling Units.
3. Packaged Terminal Air Conditioning Units.
4. Air Coils.
5. Terminal Heat Transfer Units.
6. Air Handling Units.
7. Fans.
8. Domestic Heat Exchangers
9. Air Terminal Units.
10. Air Inlets and Outlets.

3.10 MINIMUM DATA TO BE REPORTED

A. Electric Motors:
1. Manufacturer.
2. Model/Frame.
3. HP/BHP.
4. Phase, voltage, amperage; nameplate, actual, no load.
5. RPM.
6. Service factor.
7. Starter size, rating, heater elements.
8. Sheave Make/Size/Bore.

B. Air Cooled Condensers:
1. Identification/number.
2. Location.
3. Manufacturer.
4. Model number.
5. Serial number.
6. Entering DB air temperature, design and actual.
7. Leaving DB air temperature, design and actual.
8. Number of compressors.

C. Heat Exchangers:
1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Model number.
6. Serial number.
7. Steam pressure, design and actual.
8. Primary water entering temperature, design and actual.
9. Primary water leaving temperature, design and actual.
10. Primary water flow, design and actual.
11. Primary water pressure drop, design and actual.
12. Secondary water leaving temperature, design and actual.
13. Secondary water flow, design and actual.
14. Secondary water pressure drop, design and actual.

D. Cooling Coils:
1. Identification/number.
2. Location.

3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Entering air DB temperature, design and actual.
7. Entering air WB temperature, design and actual.
8. Leaving air DB temperature, design and actual.
9. Leaving air WB temperature, design and actual.
10. Water flow, design and actual.
11. Water pressure drop, design and actual.
12. Entering water temperature, design and actual.
13. Leaving water temperature, design and actual.
14. Saturated suction temperature, design and actual.
15. Air pressure drop, design and actual.

E. Heating Coils:
1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Water flow, design and actual.
7. Water pressure drop, design and actual.
8. Entering water temperature, design and actual.
9. Leaving water temperature, design and actual.
10. Entering air temperature, design and actual.
11. Leaving air temperature, design and actual.
12. Air pressure drop, design and actual.

F. Electric Duct Heaters:
1. Manufacturer.
2. Identification/number.
3. Location.
4. Model number.
5. Design kW.
6. Number of stages.
7. Phase, voltage, amperage.
8. Test voltage (each phase).
9. Test amperage (each phase).
10. Air flow, specified and actual.
11. Temperature rise, specified and actual.

G. Air Moving Equipment:
1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Arrangement/Class/Discharge.
6. Air flow, specified and actual.
7. Return air flow, specified and actual.
8. Outside air flow, specified and actual.
9. Total static pressure (total external), specified and actual.
10. Inlet pressure.
11. Discharge pressure.
12. Sheave Make/Size/Bore.
13. Number of Belts/Make/Size.
14. Fan RPM.

H. Return Air/Outside Air:

1. Identification/location.
2. Design air flow.
3. Actual air flow.
4. Design return air flow.
5. Actual return air flow.
6. Design outside air flow.
7. Actual outside air flow.
8. Return air temperature.
9. Outside air temperature.
10. Required mixed air temperature.
11. Actual mixed air temperature.
12. Design outside/return air ratio.
13. Actual outside/return air ratio.

I. Exhaust Fans:
1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Sheave Make/Size/Bore.
10. Number of Belts/Make/Size.
11. Fan RPM.

J. Duct Traverses:
1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

K. Terminal Unit Data:
1. Manufacturer.
2. Type, constant, variable, single, dual duct.
3. Identification/number.
4. Location.
5. Model number.
6. Size.
7. Minimum static pressure.
8. Minimum design air flow.
9. Maximum design air flow.
10. Maximum actual air flow.
11. Inlet static pressure.

L. Air Distribution Tests:
1. Air terminal number.
2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Area factor.

6. Design velocity.
7. Design air flow.
8. Test (final) velocity.
9. Test (final) air flow.
10. Percent of design air flow.

M. Sound Level Reports:
1. Location.
2. Octave bands - equipment off.
3. Octave bands - equipment on.

END OF SECTION

SECTION 23 07 13
DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Duct insulation.

B. Duct liner.

C. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 23 05 53 - Identification for HVAC Piping and Equipment.

1.3 REFERENCE STANDARDS

A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.

B. ASTM C411 - Standard Test Method for Hot SUrface Performance of High-Temperature Thermal Insulation

C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.

D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.

E. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

F. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

G. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.

H. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2015).

I. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.

J. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2019.

K. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2019.

L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

M. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

N. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

O. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

P. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

Q. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.

R. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

A. Manufacturer:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com/#sle.

3. Owens Corning Corporation: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C553; flexible, noncombustible blanket.
1. K value:.28 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent by weight.

C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.

D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

2.3 GLASS FIBER, RIGID

A. Manufacturer:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com/#sle.

B. Insulation: ASTM C612; rigid, noncombustible blanket.
1. K Value:.28 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Maximum Density: 8.0 pcf.

C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
3. Secure with pressure-sensitive tape.

D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
1. Minimum Service Temperature: Minus 40 degrees F.
2. Maximum Service Temperature: 180 degrees F.
3. Connection: Waterproof vapor barrier adhesive.

B. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

2.5 HAZARDOUS EXHAUST DUCT INSULATION

A. Manufacturer:
1. Unifrax I, LLC: www.unifrax.com
2. 3M Corp.: www.3m.com
3. Substitutions: See Section 01 60 00 - Product Requirements

B. Insulation: High temperature, non-combustible thermal insulation fully encapsulated in an aluminum foil fiberglass reinforced scrim covering and meeting the following requirements:
1. Thickness: 1.5"; Density: 6pcf

2. Maximum Service Temperature: 800 Degrees F.
3. ASTM C411 - Hot Surface Performance: Pass
4. ASTM C518 - R-Value: 6.19 minimum; Durability Test: Pass
5. ASTM D6329-03 - Microbial Resistance: Resistant to Mold Growth
6. ASTM E84/ UL 723 - Flame Spread Rating: <25; Smoke Developed Rating: <50
7. ASTM E136 - Non-Combustability Test: Pass
8. ASTM E119 - Full Scale Engulfment Test: 2 Hour Endurance Rating
9. ASTM E814 - Through Penetration Firestop Test: F-Rating = 2 Hours; T-Rating = 2 Hours
10. NFPA 96, 90A, 90B, 101 Compliant
11. UL 1978 Internal Grease Duct Test: Zero Clearance to Combustibles at all locations on wrap.

2.6 JACKETING AND ACCESSORIES

A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.

B. Mineral Fiber (Outdoor) Jacket: Asphalt impregnated and coated sheet, 50 lb/square.

C. Exterior Ductwork Jacketing:
1. Description: Zero permeability, absolute vapor barrier for insulation cladding and jacketing applications.
2. Thickness: 6.0 mils.
3. Maximum Temperature: 300 Deg F.
4. Puncture Resistance: 35.4 lbs.

D. Aluminum Jacket:
1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
2. Thickness: 0.016 inch sheet.
3. Finish: Smooth.
4. Joining: Longitudinal slip joints and 2 inch laps.
5. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
6. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

2.7 DUCT LINER

A. Manufacturers:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com/#sle.

B. Glass Fiber Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.
1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
3. Service Temperature: Up to 250 degrees F.
4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
5. Minimum Noise Reduction Coefficients:
   a. 1 inch Thickness: 0.45.

C. Adhesive: Waterproof, fire-retardant type, ASTM C916.

D. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test ductwork for design pressure prior to applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Insulated Ducts Conveying Air Below Ambient Temperature:
1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated Ducts Conveying Air Above Ambient Temperature:
1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.

F. External Duct Insulation Application:
1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
3. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

G. Duct and Plenum Liner Application:
1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES

A. Exhaust Ducts Within 10 ft of Exterior Openings:
1. 1" rigid liner.

B. Outside Air Intake Ducts:
1. 1" rigid in exposed locations.
2. 2" flexible for concealed.

C. Supply and Return Ducts:

1. 1" rigid liner for exposed applications.
2. 2" flexible for concealed.
3. 2" rigid for mechanical rooms.

D. Grease duct:
   1. Two layers of 1.5" hazardous exhaust duct insulation.

E. Exterior duct:
   1. 2" rigid finished with aluminum duct jacket.

F. Ducts within 10 ft of fans:
   1. 1" rigid liner upstream and downstream of fan.

G. Relief ductwork within 10 ft of exterior opening:
   1. 1" rigid liner in exposed applications.
   2. 2" flexible for concealed.

H. Transfer ducts:
   1. 1" rigid liner.

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Flexible removable and reusable blanket insulation.

C. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

C. Section 23 23 00 - Refrigerant Piping: Placement of inserts.

1.3 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019.

B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.

C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.

D. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).

E. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2018).

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, RIGID

A. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
   1. K Value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum Service Temperature: 850 degrees F.
   3. Maximum Moisture Absorption: 0.2 percent by volume.

B. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. K Value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum Service Temperature: 650 degrees F.
   3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive: Compatible with insulation.

2.3 CELLULAR GLASS

A. Block Insulation: ASTM C552, Type I, Grade 6.
   1. K Value: 0.35 at 100 degrees F.
   2. Service Temperature: 800 degrees F, maximum.
   3. Water Vapor Permeability: 0.005 perm inch maximum per inch.
   4. Water Absorption: 0.5 percent by volume, maximum.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturers:
   1. Armacell LLC: www.armacell.us/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
   1. Minimum Service Temperature: Minus 40 degrees F.
   2. Maximum Service Temperature: 180 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.5 JACKETING AND ACCESSORIES

A. PVC Plastic.
   1. Manufacturers:
      a. Johns Manville Corporation: www.jm.com/#sle.
   2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil, 0.010 inch.
      e. Connections: Brush on welding adhesive.
   3. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated Pipes Conveying Fluids Below Ambient Temperature:
   1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

H. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 84 00.

J. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.

3.3 SCHEDULE

A. Heating Systems:
1. Heating Water Supply and Return: Glass Fiber Insulation:
a. Pipe sizes 1/2" to 1-1/4" = 1-1/2" thick.
b. Pipe sizes 1-1/2" and greater = 2" thick.

B. Cooling Systems:
1. Condensate Drains from Cooling Coils: Flexible Elastomeric Cellular Insulation; All pipe sizes = 1 1/2" thick.
2. Refrigerant Suction: Flexible Elastomeric Cellular Insulation; All pipe sizes = 1 1/2" thick.
3. Refrigerant Hot Gas: Flexible Elastomeric Cellular Insulation; All pipe sizes = 1 1/2" thick.

END OF SECTION

SECTION 23 08 00
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SUMMARY

A. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for demonstrating proper operation to the commissioning authority. A commissioning authority who is hired by the owner shall supervise and approve all commissioning activities.

B. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.

C. The following HVAC equipment is to be commissioned, including commissioning activities for the following specific items:
1. HVAC controls, including equipment / system sequences of operations.
2. DDC front-end controls graphics.
3. Air handling units and associated controls.
4. Split-system air conditioning units.
5. Exhaust fans and EF systems.
6. Major and minor equipment items.
7. Piping systems and equipment.
8. Ductwork and accessories.
9. Terminal units.
10. Service water heating system
11. Lighting control systems
12. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

D. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.2 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.

B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

C. Section 23 09 93 - Sequence of Operations for HVAC Controls.

1.3 REFERENCE STANDARDS

A. ASHRAE Guideline 1.1 - The HVAC&R Technical Requirements for the Commissioning Process; 2007, with Errata (2012).

1.4 SUBMITTALS

A. Updated Submittals: Keep the owner, owner's representative, and project engineer, and Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

B. Draft Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
   1. System name.
   2. List of devices.
   3. Step-by-step procedures for testing each controller after installation, including:
      a. Process of verifying proper hardware and wiring installation.
      b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
      c. Process of performing operational checks of each controlled component.
      d. Plan and process for calibrating valve and damper actuators and all sensors.
      e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
   4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has “passed” and is operating within the contract parameters.
   5. Description of the instrumentation required for testing.
   6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the project engineer and Commissioning Authority and TAB contractor for this determination.

C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of project engineer, and Commissioning Authority.

D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
   1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
   2. Full as-built set of control drawings.
   3. Full as-built sequence of operations for each piece of equipment.
   4. Full print out of all schedules and set points after testing and acceptance of the system.
   5. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
   6. Control equipment component submittals, parts lists, etc.
   7. Warranty requirements.
   8. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
   9. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
      a. Sequences of operation.
      b. Control drawings.
      c. Points lists.
      d. Controller and/or module data.
      e. Thermostats and timers.
      f. Sensors and DP switches.
      g. Valves and valve actuators.
      h. Dampers and damper actuators.
      i. Program setups (software program printouts).

E. Project Record Documents: See Section 01 78 00 for additional requirements.
   1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.

2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.

B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

C. Provide the use of Testing and Balancing instruments used by sub-contractors, for consistency of measurements and calibration.

PART 3 EXECUTION

3.1 PREPARATION

A. Cooperate with the project engineer, and Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.

B. Furnish additional information requested by the construction manager, project engineer, and Commissioning Authority.

C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.

D. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.
1. Include cost of sheaves and belts that may be required for testing, adjusting, and balancing.

E. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.

F. Provide temperature and pressure taps in accordance with Contract Documents.
1. Provide a pressure/temperature plug at each new water sensor that is an input point to the control system.

3.2 INSPECTING AND TESTING - GENERAL

A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.

B. Perform the Functional Tests for each item of equipment or other assembly to be commissioned.

C. Provide two-way radios for use during the testing.

D. Test all functions that are described in the sequence of operations.

E. Valve/Damper Stroke Setup and Check:
   1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
   2. Set pump/fan to normal operating mode.
   3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
   4. Command valve/damper open; verify position is full open and adjust output signal as required.
   5. Command valve/damper to a few intermediate positions.
   6. If actual valve/damper position does not reasonably correspond, replace actuator.
   7. Closure for Heating Coil Valves - Normally Open:
      a. Set heating setpoint 20 degrees F above room temperature.
      b. Observe valve open.
      c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
      d. Restore to normal.
      e. Set heating setpoint to 20 degrees F below room temperature.
      f. Observe the valve close.
      g. Restore to normal.
   8. Closure for Cooling Coil Valves - Normally Closed:
      a. Set cooling setpoint 20 degrees F above room temperature.
      b. Observe the valve close.
      c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
      d. Restore to normal.
      e. Set cooling setpoint to 20 degrees F below room temperature.
      f. Observe valve open.
      g. Restore to normal.

F. Coil Valve Leak Check:
   1. Method 1 - Water Temperature With 2-Way Valve:
      a. Calibrate water temperature sensors on each side of coil to be within 0.2 degree F of each other.
      b. Turn off air handler fans, close outside air dampers. Keep pump running. Make sure appropriate coil dampers are open.
      c. Normally closed valves will close.
      d. Override normally open valves to the closed position.
      e. After 10 minutes observe water delta T across coil. If it is greater than 2 degrees F (, leakage is probably occurring.
      f. Reset valve stroke to close tighter.
      g. Repeat test until compliance is achieved.

G. Isolation Valve or System Valve Leak Check: For valves not by coils.
   1. With full pressure in the system, command valve closed.
   2. Use an ultra-sonic flow meter to detect flow or leakage.

H. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.3 TAB COORDINATION

A. TAB: Testing, adjusting, and balancing of HVAC.

B. Coordinate commissioning schedule with TAB schedule.

C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.

D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.

E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.

F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.4 CONTROL SYSTEM FUNCTIONAL TESTING

A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of Contract Documents and the detailed Sequences of Operation documentation submittal.

B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with Contract Documents.

C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system.

D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Owner.
2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.

E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.

F. Demonstrate the following to the owner, project engineer, and Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
1. Setpoint changing features and functions.
2. Sensor calibrations.

G. Demonstrate to the owner, project engineer, and Commissioning Authority:
1. That all specified functions and features are set up, debugged and fully operable.
2. That scheduling features are fully functional and setup, including holidays.
3. That all graphic screens and value readouts are completed.
4. Correct date and time setting in central computer.
5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.
6. Power failure and battery backup and power-up restart functions.
7. Global commands features.
8. O&M schedules and alarms.
9. Occupancy sensors and controls.
10. All control strategies and sequences not tested during controlled equipment testing.

H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to

acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

3.5 OPERATION AND MAINTENANCE MANUALS

A. See Section 01 78 00 for additional requirements.

B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

C. Submit manuals related to items that were commissioned to project engineer and Commissioning Authority for review; make changes recommended by project engineer and the Commissioning Authority.

3.6 PRELIMINARY COMMISSIONING REPORT

A. The preliminary commissioing report shall include the following:
   1. Itemization of deficiencies found during the testing required by this section that have not been corrected at the time of report preparation.
   2. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions.
   3. Climatic conditions required for performance of the deferred tests.
   4. Results of functional performance tests.
   5. Functional perfomance test procedures used during the commissioning process, including measurable criteria for test acceptance.

3.7 FINAL COMMISSIONING REPORT

A. See Section 01 78 00 for additional requirements

B. The final commissioning report shall include the following:
   1. Results of functional performance tests.
   2. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.
   3. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, prvided herein for repetability.

C. The final report shall be submitted to the engineer as a submittal for approval, and will serve as the final indication that all work has been executed in accordance with the design.

D. The final report and any other documentation listed above shall be turned over to the building owner or owner's authorized agent within 90 days of the the date of receipt of the certificate of occupancy.

END OF SECTION

SECTION 23 09 23
DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. This project is an extension of the existing Siemens Controls Energy Management and Control System. The owner will purchase Temperature Controls for HVAC systems by OGS state contract. This section is included for reference; the Heating Contractor will be responsible for installing control components in the piping and duct work systems, such as but not excluding the following: Automatic Control Dampers, Automatic Control Valves, Temperature Sensing Thermal Wells and Pressure Control Sensing Taps.
   1. This project is a design make Siemens Control System.
   2. Furnish all labor, materials, equipment, and service necessary to provide a complete and operating temperature control system. System shall use Direct Digital Controls, electronic interfaces and actuation devices, as shown on the drawings and as described herein. Control sequences are specified in this section.
      a. All actuation of valves and dampers shall be electric unless specifically called out elsewhere in the specifications or drawings.
   3. The Building Automation System (BAS) shall have the following capabilities as described in these specifications:
      a. The Network Control Units (NCU)(s) and Computer(s) shall be connected directly to the Owners Ethernet Network.
      b. Off site access for Owner's personnel shall be provided and shall have full workstation capability from remote location. Identical graphical displays shall be provided for offsite access to match the displays at the on-site Operator Workstation. Connection to the site shall be via a high speed Ethernet connection. The contractor shall coordinate with the Owners IT professionals for high speed system access and shall comply with Owners requirements to maintain the level of security required by the Owner.
      c. The system shall be capable of supporting the email of alarms.
      d. Network controllers shall all be flash upgradeable and not require changing chips for upgrades.
      e. Short term logging of historical data shall be provided for every DDC input and output in the system. Each point shall be logged for a minimum of 2 weeks.

B. QUALITY ASSURANCE
   1. All labor, material, equipment and software necessary to meet the functional intent of the system, as specified herein and as shown on the drawings, shall be provided by one of the manufacturers listed in Part 2 - Products. Equipment and labor not specifically referred to herein or on the plans, which are required to meet the functional intent, shall be provided without additional cost to the Owner. This contractor also is responsible for all costs of changes in the work required by substitute equipment.
   2. The Building Management System (BMS) Contractor must have been in business for not less than 10 years, and providing BMS systems must be the Contractors primary business. BMS Contractor must be a branch office of the manufacturers specified. BMS Contractor must have a trained staff of application engineers, project managers, software engineers, commissioning staff, and service staff experienced in the configuration, programming and service of the automation system.
   3. The BMS Contractor shall have a training facility with regularly scheduled training as outlined in this Section, so as to provide ongoing regularly scheduled application training.

4. Manufacturer: A firm regularly engaged in manufacture of microprocessor temperature control equipment, of types and sizes which are similar to required equipment, and which have been in satisfactory use for not less than 10 years, in similar service.
5. Electrical standards: Provide electrical products that comply with the following agency approvals:
   a. UL-916; Energy Management Systems for BAS components and ancillary equipment
   b. UL-873; Temperature Indication and Regulating Equipment
   c. FCC, Part 15, Subpart J, Class A Computing Devices
6. All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, Local and National codes.

C. SCOPE OF WORK
1. Except as otherwise noted, the control system shall consist of all Ethernet Network Controllers, Standalone Digital Control Units, workstations, software, sensors, transducers, relays, valves, dampers, damper operators and other accessory equipment, along with a complete system of electrical interlocking wiring as required to fill the intent of the specification and provide for a complete and operable system. Except as otherwise specified, provide operators for equipment such as dampers if the equipment manufacturer does not provide these. Coordinate requirements with the various Contractors.
2. The BAS contractor shall review and study all HVAC drawings and the entire specification to familiarize himself with the equipment and system operation and to verify the quantities and types of dampers, operators, alarms, etc. to be provided.
3. All interlocking, wiring and installation of control devices associated with the equipment listed below shall be provided under this Contract. When the BAS system is fully installed and operational, the BAS Contractor shall review and check out the system. At that time, the BAS contractor shall demonstrate the operation of the system to the Owner and prove that it complies with the intent of the drawings and specifications.
   a. The Contractor shall furnish and install a complete building automation system including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as called for in this specification.
4. Provide services and manpower necessary for commissioning of system in coordination with the HVAC Contractor, Balancing Contractor and Owner’s representative. Commissioning reports showing the testing of each DDC point on the system shall be submitted to the Engineer for review and approval upon completion of the commissioning process. See PART 3 Commissioning and System Startup section for detail.
5. All work performed under this section of the specifications shall comply with all codes, laws and governing bodies. If the drawings and/or specifications are in conflict with governing codes, the Contractor shall submit a proposal with appropriate modifications to the project for code compliance. If this specification and associated drawings exceed governing code requirements, the specification shall govern. The Contractor shall obtain and pay for all necessary construction permits and licenses.

D. TRAINING
1. The BAS Contractor shall provide both on-site and classroom training to the Owner’s representative and maintenance personnel per the following description:
   a. On-site training shall consist of a minimum of (16) hours of hands-on instruction geared at the operation and maintenance of the systems. The curriculum shall include:
      1) System Overview
      2) System Software and Operation
         (a) System access
         (b) Software features overview
         (c) Changing setpoints and other attributes
         (d) Scheduling
         (e) Editing programmed variables

(f) Displaying color graphics
(g) Running reports
(h) Workstation maintenance
(i) Application programming

3) Operational sequences including start-up, shutdown, adjusting and balancing.
4) Equipment maintenance.

2. Classroom training shall include a minimum of (2) training slots for two days of course material covering workstation operation and controller programming. The cost for travel and lodging shall be included in this contract if Training Center is more than 150 miles from the Project Site.
3. The training facility shall have the capability to a provide hands on training experience for all applications that can be run on the Siemens APOGEE Insight application.
4. The training facility shall have the capability to train on the owners system through off site connection.

E. SYSTEM DESCRIPTION
1. The Building Automation System (BAS) shall consist of PC-based workstations and microcomputer controllers of modular design providing distributed processing capability, and allowing future expansion of both input/output points and processing/control functions.
   a. Standalone Digital Control Units (SDCUs): Provide the necessary quantity and types of SDCUs to meet the requirements of the project for mechanical equipment control including air handlers, central plant control, and terminal unit control. Each SDCU shall operate completely standalone, containing all of the I/O and programs to control its associated equipment.
   b. A high speed Ethernet connection to the site shall be used for off site access to the site. BMS contractor shall coordinate with the Owners IT professionals for high speed system access and shall comply with Owners requirements to maintain the level of security required by the Owner. Coordinate with Owner and provide VPN (Virtual Private Network) as required, to comply with the Owner's IT professionals requirements.

F. WORK BY OTHERS
1. The BAS Contractor shall cooperate with other contractors performing work on this project necessary to achieve a complete and neat installation. To that end, each contractor shall consult the drawings and specifications for all trades to determine the nature and extent of others' work.
2. The BAS Contractor shall furnish all control valves, sensor wells, flow meters and other similar equipment specified in this section for installation by the Mechanical Contractor.
3. The BAS Contractor shall provide field supervision to the designated contractor for the installation of the following:
   a. Automatic Control Dampers
   b. Automatic Control Valves.
   c. Temperature Sensing Thermal Wells
   d. Pressure Control Sensing Taps

G. WARRANTY AND ACCEPTANCE
1. The microprocessor temperature control contractor shall warrant the control system installed in this contract to be free from defects in material and workmanship, except for damages from other causes, for a period of one year after final acceptance from the owner. The microprocessor temperature control contractor shall be responsible for all necessary revisions to the software required for a workable system performance through the first year of operation. Any changes in the software shall be transmitted immediately to the owner. The software responsibility is for a complete and workable system as described in the control cycle description of the specification. The software shall become the property of the owner.

2. Updates to the manufacturer's software shall be provided at no charge during the warranty period.
3. All equipment required to maintain operation of the temperature control system for the project shall be immediately available in the event of component failure. A spare or loaner piece of equipment shall be installed immediately when a failure occurs and the equipment shall be returned to the factory for repair.
4. Submit a proposal to provide all services, materials and the equipment necessary for preventative maintenance on the entire system for a period of one year. The work covered in this proposal shall include maintenance of the control equipment including all computer equipment, CPU, peripherals, transmission equipment, and related HVAC control devices.

H. SUBMITTALS
1. Submit five (5) copies of submittal data and shop drawings to the Engineer for review prior to ordering or fabrication of the equipment. Prior to submitting, the Contractor shall check all documents for accuracy.
2. The Engineer will make corrections, if required, and return to the Contractor. The Contractor shall then resubmit with the corrected or additional data. This procedure shall be repeated until all corrections are made to the satisfaction of the Engineer and the submittals are fully approved.
3. Each point in the system shall be tested for both hardware and software functionality. In addition, each mechanical and electrical system under control of the BAS shall be tested against the appropriate sequence of operation specified herein. Successful completion of the system test shall constitute the beginning of the warranty period. A written report shall be submitted to the owner indicating that the installed system functions in accordance with the plans and specifications.
4. The BAS contractor shall commission and set in operating condition all major equipment and systems, such as the hot water and all air handling systems, in the presence of the equipment manufacturer's representatives, as applicable, and the Owner and Architect's representatives. See PART 3 for detail required in Commissioning the system.
5. The BAS Contractor shall provide all manpower and engineering services required to assist the HVAC Contractor and Balancing Contractor in testing, adjusting, and balancing all systems in the building. The BAS Contractor shall have a trained technician available on request during the balancing of the systems. The BAS Contractor shall coordinate all requirements to provide a complete air balance with the Balancing Contractor and shall include all labor and materials in his contract.

I. OPERATING AND MAINTENANCE MANUALS
1. The operation and maintenance manuals shall contain all information necessary for the operation, maintenance, replacement, installation, and parts procurement for the entire BAS. This documentation shall include specific part numbers and software versions and dates. A complete list of recommended spare parts shall be included with the lead-time and expected frequency of use of each part clearly identified.
2. Following project completion and testing, the BAS contractor shall submit as-built drawings reflecting the exact installation of the system. The as-built documentation shall also include a copy of all application software in written form.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer - Provide the following microprocessor control system:
1. Siemens Industry Incorporated.

B. SYSTEM ARCHITECTURE

1. The Building Management System (BMS) shall consist of Network Area Controllers (NACs), a family of Local Controllers, Administration and Programming Workstations (APWs), Operator Workstations (OWs), and a File Server to support system configurations where more than three operator workstations are required. The BMS shall provide control, alarm detection, scheduling, reporting and information management for the entire facility, and Wide Area Network (WAN) if applicable, from a single ODBC-compliant SQL database. The system shall be designed with a top-level 10/100bT Ethernet network, using ISO 8802-3 data link/physical layer. A sub-network using the RS-485 token passing protocol, with a minimum of 19.2kb speed, shall connect the local, stand-alone controllers with Ethernet-level controller/routers.
2. Level 1 Network Description: Level 1, the main backbone of the system, shall be an ISO 8802-3, 10/100bT LAN/WAN, using Ethernet as the communications protocol. Network Area Controllers, Operator Workstations, and Servers shall connect directly to this network without the need for Gateway devices.
3. Level 2 Network Description: Level 2 of the system shall consist of one or more local Controllers. Minimum speed shall be 19.2kbps. The Level 2 field bus consists of an RS485, token passing bus that supports up to 127 Local Controllers to operate HVAC equipment, lighting, power metering and monitoring, fuel tank monitoring, UPS battery and generator monitoring, smoke and fire detection, water leak detection, and video surveillance and access control.
4. BMS LAN Segmentation: The BMS shall be capable of being segmented, through software, into multiple local area networks (LANs) distributed over a wide area network (WAN), sharing a single file server. This enables workstations to manage a single LAN (or building), and/or the entire system with all devices being assured of being updated by and sharing the most current database. In the case of a single workstation system, the workstation shall contain the entire database – with no need for a separate file server.
5. Standard Network Support: All NACs, Workstations and Servers shall be capable of residing directly on the owner's Ethernet TCP/IP LAN/WAN with no required gateways. Furthermore, the NACs, Workstations and Servers shall be capable of using standard, commercially available, off-the-shelf Ethernet infrastructure components such as routers, switches and hubs. With this design the owner may utilize the investment of an existing or new enterprise network or structured cabling system. This also allows the option of the maintenance of the LAN/WAN to be performed by the owner's Information Technology (IT) Department as all devices utilize standard TCP/IP components.
6. System Expansion: The BMS shall be scalable and expandable at all levels using the same software interface and the same Level 1 and Level 2 controllers. Systems that require replacement of either the workstation software or field controllers in order to expand the system shall not be acceptable.
7. Support for Open Systems Protocols: The BMS design must include solutions to integrate the following open system protocols: BACnet, LonTalkÔ, Modbus, and digital data communication to third party microprocessors such as chiller controllers, smoke, fire and life safety panels and variable frequency drives (VFDs).
    a. The system shall conform to open communications standards such as Java, Corba, HTTP, XML, LDAP, SNMP and .NET.
    b. The system shall provide the ability to program custom ASCII communication drivers that reside in a Gateway to communicate with third party systems and devices. These drivers will provide real time monitoring and control of the third party systems. Once programmed, these data points shall be monitored and controlled in exactly the same manner as native BMS data points.

C. NETWORK CONTROL UNITS (NCUs)
1. General: Network Area Controllers shall combine both network routing functions and control functions in a single unit. NACs shall route communications between the Level 1 Ethernet network and the Level 2 RS-485 field network. They shall also be responsible for monitoring and controlling their own HVAC equipment such as AHUs, CRAC units or chillers. A sufficient number of NACs shall be supplied to fully meet the requirements of this specification and the attached point list.

2. Hardware Specifications
   a. Memory: Both the operating system of the controller, plus the application program for the controller, shall be stored in non-volatile, flash memory. Controllers shall contain enough memory for the current application, plus required history logging, plus a minimum of 20% additional free memory.
   b. Communication Ports: Each NAC shall provide communication to both the Workstation(s) and the field buses. An on-board 10/100bT Ethernet port shall be provided, as well as a RS-485 port for communications to a maximum of 127 MS/TP devices.
   c. Modular Expandability: The system shall employ a modular I/O design to allow easy expansion. Input and output capacity is to be provided through plug-in modules of various types. It shall be possible to combine I/O modules as desired to meet the I/O requirements for individual control applications.
   d. Hardware Override Switches: All digital outputs shall have an option to include three position manual override switches to allow selection of the ON, OFF, or AUTO output state. These switches shall be built into the unit and shall provide feedback to the controller so that the position of the override switch can be obtained through software. In addition each analog output shall be equipped with an override potentiometer to allow manual adjustment of the analog output signal over its full range, when the 3 position manual override switch is placed in the ON position.
   e. Local Status Indicator Lamps: Provide as a minimum LED indication of CPU status, Ethernet LAN status, and field bus status. For each output, provide LED indication of the value of the output (On/Off). For each output module provide an LED which gives a visual indication of whether any outputs on the module are manually overridden.
   f. Real Time Clock (RTC): Each NAC shall include a battery-backed, real time clock, accurate to 10 seconds per day. The RTC shall provide the following: time of day, day, month, year, and day of week. The system shall automatically correct for daylight savings time and leap years and be Year 2000 compliant.
   g. Power Supply: The power supply for the NACs shall be auto sensing, 24Vac/10-40Vdc power, with a tolerance of +/- 20%. Line voltage below the operating range of the system shall be considered outages. The controller shall contain over voltage surge protection, and require no additional AC power signal conditioning.
   h. Automatic Restart after Power Failure: Upon restoration of power after an outage, the NAC shall automatically and without human intervention: update all monitored functions; resume operation based on current, synchronized time and status, and implement special start-up strategies as required.
   i. Battery backup: The NAC shall include an on-board battery to back up the controller’s RAM memory. The battery shall provide accumulated backup of all RAM and clock functions for at least 30 days. In the case of a power failure, the NAC shall first try to restart from the RAM memory. If that memory is corrupted or unusable, then the NAC shall restart itself from its application program stored in its flash memory.
3. Software Specifications
   a. General: The NAC shall contain flash memory to store both the resident operating system AND the application software. There will be no restrictions placed on the type of application programs in the system. Each NAC shall be capable of parallel processing, executing all control programs simultaneously. Any program may affect the operation of any other program. Each program shall have the full access of all I/O facilities of the processor. This execution of control function shall not be interrupted due to normal user communications including interrogation, program entry, printout of the program for storage, etc.
   b. User Programming Language: The application software shall be user programmable. This includes all strategies, sequences of operation, control algorithms, parameters, and setpoints. The source program shall be English language-based and programmable by the user. The language shall be structured to allow for the easy

configuration of control programs, schedules, alarms, reports, telecommunications, local displays, mathematical calculations, passwords, and histories. The language shall be self-documenting. Users shall be able to place comments anywhere in the body of a program. Program listings shall be configurable by the user in logical groupings. Controllers should be freely programmable. Fixed function controllers will not be accepted.

c. Control Software: The NAC shall have the ability to perform the following pre-tested control algorithms:
   1) Proportional, Integral plus Derivative Control (PID)
   2) Self Tuning PID
   3) Two Position Control
   4) Digital Filter
   5) Ratio Calculator
   6) Equipment Cycling Protection

d. Mathematical Functions: Each controller shall be capable of performing basic mathematical functions (+, -, *, /), squares, square roots, exponential, logarithms, Boolean logic statements, or combinations of both. The controllers shall be capable of performing complex logical statements including operators such as >, <, =, and, or, exclusive or, etc. These must be able to be used in the same equations with the mathematical operators and nested up to five parentheses deep.

e. Energy Management Applications: NACs shall have the ability to perform any or all of the following energy management routines:
   1) Time of Day Scheduling
   2) Calendar-based Scheduling
   3) Holiday Scheduling
   4) Temporary Schedule Overrides
   5) Optimal Start
   6) Optimal Stop
   7) Enthalpy Switchover (Economizer)
   8) Peak Demand Limiting
   9) Temperature Compensated Duty Cycling
   10) CFM Tracking
   11) Heating/Cooling Interlock
   12) Hot/Cold Deck Reset
   13) Free Cooling
   14) Hot Water Reset
   15) Chilled Water Reset
   16) Condenser Water Reset
   17) Chiller Sequencing

f. History Logging: Each controller shall be capable of locally logging any input, output, calculated value or other system variable tracked over user defined time intervals ranging from 1 second to 1440 minutes. Any system can be logged in history. A minimum of 1000 values shall be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.

g. Alarm Management: For each system point, alarms may be created based on high/low limits or conditional expressions. All alarms shall be tested each scan of the NAC and may result in the display of one or more alarm messages or reports.
   1) Up to 8 alarms may be configured for each point in the controller.
   2) Alarms shall be generated based on their priority. A minimum of 255 priority levels shall be provided.
   3) If communication with the Operator Workstation is temporarily interrupted, the alarm shall be time-stamped and buffered in the NAC. When communications

return, the alarm shall be transmitted to the Operator Workstation if the point is still in the alarm condition.

h. Embedded Web Server: Each NAC must have the ability to serve out customized HTML web pages containing any desired I/O values from the entire BMS.

i. Integration to other equipment: Each NAC must be able to connect to or communicate with any of the following equipment as required to complete the scope of work:
   1) CRAC Units (Computer Room Air Conditioning)
   2) UPS Equipment (Uninterruptible Power Supplies)
   3) Power Monitoring Equipment
   4) Leak Detection Equipment
   5) VESDA Equipment (Very Early Smoke Detection Alarm)
   6) Fire Alarm (FACP)
   7) Lighting Control Panels
   8) Generators
   9) Battery Monitoring Equipment
   10) Automatic Transfer Switches
   11) Variable Frequency Drives
   12) Other equipment as shown within this document or called out in the plans
   13) Integration to these devices must include 2 way communication where required to monitor all alarm points, status, setpoints, runtime, and information relevant to the operation of the system. The system must be able to provide start and stop signals, make setpoint changes, and adjust values as needed.

D. LOCAL CONTROLLERS

1. General: Local Controllers shall provide control of HVAC, CRAC units, lighting, power metering, electrical monitoring, UPS, and leak detection. This may include air handling units, rooftop units, variable air volume boxes, unit ventilators, smoke, fire and life safety systems, and other mechanical equipment. Each controller shall be fully programmable, contain its own control programs and will continue to operate in the event of a failure or communication loss to its associated NAC.

2. Hardware Specification:

a. Memory: Both the operating system of the controller, plus the application program for the controller, shall be stored in non-volatile, flash memory. Controllers shall contain enough memory for the current application, plus required history logging, plus a minimum of 20% additional free memory.

b. Communication Ports: Local Controllers shall have a RS-485 communication port field bus, operating at a speed of at least 19.2kbps.

c. Input/Output: Each local Controller shall have enough inputs and outputs to meet the application's required point count. Each local controller shall support universal inputs, whereas any input may be software-defined as:
   1) Digital Inputs for status/alarm contacts
   2) Counter Inputs for summing pulses from meters.
   3) Thermistor Inputs for measuring temperatures in space, ducts and thermowells.
   4) Analog inputs for pressure, humidity, flow and position measurements.

d. Local controllers must support both digital and analog output types:
   1) Digital Outputs for on/off equipment control.
   2) Analog Outputs for valve and damper position control, and capacity control of primary equipment.

e. Expandability: For larger controllers (16 base inputs and up), provide input and output expansion through the use of plug-in modules. At least two I/O modules must be capable of being added to the base Local Controller.

f. Hardware Override Switches: All digital outputs on air handling unit controllers shall have the option to include three position manual override switches to allow selection of the ON, OFF, or AUTO output state. These switches shall be built into the unit and

shall provide feedback to the controller so that the position of the override switch can be obtained through software. In addition each analog output on air handling unit controllers shall be equipped with an override potentiometer to allow manual adjustment of the analog output signal over its full range, when the 3 position manual override switch is placed in the ON position.

g. Networking: Each local controller will be able to exchange information on a peer to peer basis with other Interoperable Digital Controller. Each local controller shall be capable of storing and referencing global variables (on the LAN) with or without any workstations online. Each local controller shall be able to have its program viewed and/or enabled/disabled through a workstation connected to an NAC.
h. Indicator Lamps: Local Controllers will have as a minimum, LED indication of CPU status, and field bus status.
i. Real Time Clock (RTC): All Local Controllers shall have a real time clock in either hardware or software. The accuracy shall be within 10 seconds per day. The RTC shall provide the following information: time of day, day, month, year, and day of week. Each Local Controller shall receive a signal, every hour, over the network from the NAC, which synchronizes all Local Controllers real time clocks.
j. Automatic Restart after Power Failure: Upon restoration of power, the Local Controller shall automatically and without human intervention, update all monitored functions, resume operation based on current, synchronized time and status, and implement special start-up strategies as required.
k. Battery Back Up: All Local Controllers shall store all programming in non-volatile flash memory. All Local Controllers except terminal controllers shall include an on-board lithium battery to back up the controller's RAM memory. The battery shall have a shelf life of over 10 years, and provide accumulated backup of all RAM and clock functions for at least 3 years. In the case of a power failure, the Local Controller shall first try to restart from the RAM memory. If that memory is corrupted or unusable, then the Local Controller shall restart itself from its application program stored in its flash memory.

3. Software Specification:
   a. General: The Local Controller shall contain flash memory to store both the resident operating system AND the application software. There will be no restrictions placed on the type of application programs in the system. Each Local Controller shall be capable of parallel processing, executing all control programs simultaneously. Any program may affect the operation of any other program. Each program shall have the full access of all I/O facilities of the processor. This execution of control function shall not be interrupted due to normal user communications including interrogation, program entry, printout of the program for storage, etc.
   b. User Programming Language:
      1) The application software shall be user programmable, using the same language as that defined for Network Area Controllers. Controllers should be freely programmable. Fixed function controllers will not be accepted.
      2) Control Software, Mathematical Functions, and Energy Management Applications must be identical to that which is provided with the Network Area Controller.
   c. History Logging: Each controller shall be capable of locally logging any input, output, calculated value or other system variable over user defined time intervals ranging from 1 second to 1440 minutes. Any system can be logged in history. A minimum of 1000 values shall be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.
   d. Alarm Management:
      1) For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms will be tested each scan of the Local

Controllers and can result in the display of one or more alarm messages or reports.
2) Up to 8 alarms can be configured for each point in the controller.
3) Alarms will be generated based on their priority. A minimum of 255 priority levels shall be provided.
4) If communication with the Operator Workstation is temporarily interrupted, the alarm will be time-stamped and buffered in the controller. When communications return, the alarm will be transmitted to the Operator Workstation if the point is still in the alarm condition.

4. Air Handler Controllers
   a. AHU Controllers shall be capable of meeting the requirements of the sequence of operation found in the Execution portion of this specification and for future expansion.
   b. AHU Controllers shall support all the necessary point inputs and outputs as required by the sequence and operate in a standalone fashion.
   c. AHU Controllers shall be fully user programmable to allow for modification of the application software.
5. VAV Terminal Unit Controllers
   a. VAV Terminal Unit Controllers shall support, but not be limited to the control of the following configurations of VAV boxes to address current requirements as described in the Execution portion of this specification, and for future expansion:
      1) Single Duct Cooling Only
      2) Single Duct Cooling with Reheat (Electric or Hot Water)
      3) Fan Powered (Parallel or Series)
      4) Dual Duct (Constant or Variable Volume)
      5) Supply/Exhaust
   b. VAV Controllers for single duct applications will come equipped with a built-in actuator for modulation of the air damper. The actuator shall have a minimum torque rating of 35 in.-lb., and contain an override mechanism for manual positioning of the damper during startup and service.
   c. VAV Controllers shall contain an integral velocity sensor accurate to +/- 5% of the full range of the box's CFM rating.
   d. Each controller shall perform the sequence of operation described in Part 3 of this specification, and have the capability for local time-of-day scheduling, occupancy mode control, after-hours operation, lighting control, alarming, and trending.
6. Unitary Controllers
   a. Unitary Controllers shall support, but not be limited to, control of the following systems as described in the Execution portion of this specification, and for future expansion:
      1) Unit Ventilators
      2) Heat Pumps (Air to Air, Water to Water)
      3) Packaged Rooftops
      4) Fan Coils (2 or 4 Pipe)
   b. The I/O of each Unitary Controller shall contain sufficient quantity and types, as required, to meet the sequence of operations found in the Execution portion of this specification. In addition, each controller shall have the capability for local time of day scheduling, occupancy mode control, after hour operation, lighting control, alarming, and trending.

E. Communications to 3rd Party Devices
   1. General: Where required, provide a Gateway to interface to that equipment that use the Modbus protocol, LONworks protocol, or other proprietary or open protocols. The Gateway shall communicate directly over Ethernet TCP/IP.
   2. Communication Ports: In addition to its on-board Ethernet port, the Gateway shall have at least two serial communications ports for interfaces to third-party systems.

3. Memory: The Gateway shall have enough RAM memory to store all point configuration data, plus required history logging and alarm buffering. Minimum RAM shall be 8MB. The operating system of the gateway must be stored in flash non-volatile memory.
4. User Programming Language:
   a. The Gateway shall employ the same user programmable application software that NACs and Local Controllers use.
   b. Control Software, Mathematical Functions, and Energy Management Applications must be identical to that which is provided with the Network Area Controller. Gateways that do not have an application programming language will not be accepted.
5. History Logging: Each Gateway shall be capable of locally logging any input, output, calculated value or other system variable over user defined time intervals ranging from 1 second to 1440 minutes. Any system can be logged in history. A minimum of 1000 values shall be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.

F. Workstations and Software
   1. General
      a. The operator workstation portion of the BMS shall consist of one or more administration and programming workstations (thick-clients), and one or more web-based operator workstations (thin-clients).
      b. The administration and programming workstation software shall be configurable as either a single workstation system (with a local database) or multi-workstation system with the database located on a central file server. The client software on multi-workstation systems shall access the file server database program via an Ethernet TCP/IP network running at 100MBPS.
      c. The web-based user interface software must be capable of expansion up to 100 concurrent users.
      d. All configuration workstations shall be Pentium 4-based hardware operating under the Microsoft Windows XP operating system.
      e. The application software shall be capable of communication to all Network Area Controllers and Local Controllers, feature high-resolution graphics, alarming, reporting, and be user configurable for all data collection and data presentation functions.
      f. For multi-workstation systems, a minimum of 256 workstations shall be allowed on the Ethernet network along with the central file server.
      g. In this client/server configuration, any changes or additions made from one workstation shall automatically appear on all other workstations without the requirement for manual copying of files.
      h. Multi-workstation systems without a central database will not be acceptable.
      i. Multi-workstation systems with distributed/tiered file servers and a central (master) database will be acceptable.
   2. Hardware Requirements
      a. File Server Requirements. The file server shall consist of the following:
         1) Dell PowerEdge R210 II - 1U Rack mount Server
         2) Xeon E3-1230 3.2 GHz, 8M Cache, Turbo, Quad Core/8T
         3) 8GB Ram, 1333MHz
         4) Dual Gigabit Network Adapter
         5) DVD+/-RW Drive SATA
         6) 3 - 300 GB 10K SAS Hard Drives, RAID 5
         7) 15.5” chassis w/2-PPost/4-Post 1U Static Rails
         8) Microsoft Windows Server 2008 Standard 64/32 bit
         9) Microsoft SQL Server 2008 Standard STD 64-Bit
         10) Microsoft SQL Server 2008 Cals (5)

11) McAfee – Anti Virus
12) Ultra VNC – Remote Connect
13) Minuteman – UPS (EN600)
14) Universal Rack Shelf

b. Workstation Requirements (For multi-workstation configuration). The workstation shall consist of the following:
1) Base Unit: Intel Core i5 2400 Processor (3.1GHz,6M)
2) 4GB DDR3, Non-ECC, 1333MHz Dual Channel SDRAM, 2x2GB
3) 2-500 GB 3.5SATA with 16MB DataBurst Cache (Raid 1)
4) 16X DVD+/-RW Drive
5) Intel HD Graphics 2000 (1DP & 1VGA)
6) Dell USB Entry Keyboard, English
7) Dell MS111 USB Optical Mouse
8) Internal Dell Business Audio Speaker
9) Windows 7 Professional, SP1, w XP Mode, 32-bit
10) Monitor: ViewSonic VA2231wm - LCD display
(a) TFT – 22" – widescreen – 1920 x 1080 – 300 cd/m2 – 1000:1 – 100000:1 (dynamic)
(b) 5ms – 0.282mm – DVI-D, VGA – speakers - black

c. Printer: Provide a workstation printer to display alarms and graphics. The printer is to be a HP-855C Inkjet or equivalent.

3. Administration and Programming Workstation Software
a. General Description:
1) The software architecture shall be object-oriented in design, a true 32-bit application suite utilizing Microsoft's OLE, OPC and ODBC technologies. These technologies make it easy to fully utilize the power of the operating system to share, among applications (and therefore to the users of those applications), the data available from the BMS.
2) The workstation functions shall include monitoring and programming of all Network Area and Interoperable DDC controllers. Monitoring should consist of alarming, reporting, graphic displays, long-term data storage, automatic data collection, and operator-initiated control actions such as schedule and setpoint adjustments.
3) The software shall provide SNMP traps for communication with owner determined network management software such as IBM's Tivoli or HP OpenView. This integration shall be for the delivery of alarms or other critical information as required by owner personnel.
4) Programming of controllers shall be capable of being done either off-line or on-line from any operator workstation. All information will be available in graphic or text displays. Graphic displays will feature animation effects to enhance the presentation of the data, to alert operators of problems, and to facilitate location of information throughout the DDC system. All operator functions shall be selectable through a mouse.

b. System Database: The files server database engine must be Microsoft SQL Server, or another ODBC-compliant relational database program. The system database shall contain all point configurations and programs in each of the controllers that have been assigned to the network. In addition, the database will contain all workstation files including a GUI, alarm reports, text reports, historical data logs, schedules, and controller polling records.

c. User Interface: The BMS workstation software shall allow the creation of a custom, browser-style interface linked to the user who has logged into the workstation software. This interface shall support the creation of "hot-spots" that the user may link to view/edit any object in the system or run any object editor or configuration tool contained in the software. Furthermore, this interface must be able to be configured to become a user's "PC Desktop" with all the links that a user needs to run other

applications. This, along with the Windows XP user security capabilities, will enable a system administrator to setup workstation accounts that not only limit the capabilities of the user within the BMS software but may also limit what a user can do on the PC and/or LAN/WAN. This might be used to ensure, for example, that the user of an alarm monitoring workstation is unable to shutdown the active alarm viewer and/or unable to load software onto the PC.

d. User Security: The software shall be designed so that each user of the software can have a unique username and password. This combination of username and password shall be linked to a set of capabilities within the software, set by and editable only by, a System Administrator. The sets of capabilities shall range from View only, Acknowledge alarms, Enable/disable and change values, Program, and Administer. The system shall allow the above capabilities to be applied independently to each and every class of object in the system. The system must allow a minimum of 256 users to be configured per workstation. There shall be an inactivity timer adjustable in the software that automatically logs off the current operator when the timer has expired.

e. Configuration Interface:
   1) The workstation software shall use a Graphical User Interface (GUI) for an operator or programmer to view and/or edit objects (controller, point, alarm, report, schedule, etc.) in the BMS. In addition, this interface shall present a “network map” of all controllers and their associated points, programs, graphics, alarms, and reports in an easy to understand structure. All object names shall be alphanumeric and use Windows long filename conventions.
   2) The configuration interface shall also include support for template objects. These template objects shall be used as building blocks for the creation of the BMS SQL database. The types of template objects supported shall include all data point types (input, output, string variables, setpoints, etc.), alarm algorithms, alarm notification objects, reports, graphics displays, schedules, and programs. Groups of template object types shall be able to be set up as template sub-systems and systems. The template system shall prompt for data entry if necessary. The template system shall maintain a link to all “child” objects created by each template. If a user wishes to make a change to a template object, the software shall ask the user if he/she wants to update all of the child objects with the change. This template system shall facilitate configuration and programming consistency and afford the user a fast and simple method to make global changes to the BMS.

f. Graphical User Interface (GUI)
   1) The system shall allow for the creation of user defined, color graphics to view mechanical and electrical systems, or building schematics. These graphics shall contain point information from the database including any attributes associated with the point (engineering units, etc.). In addition operators shall be able to command equipment or change setpoints from a graphic with a mouse device. Requirements of the GUI subsystem include:
      (a) High resolution bit-mapped displays. The user shall have the ability to import AutoCAD-generated picture files as background displays.
      (b) A built-in library of animated objects such as dampers, fans, pumps, buttons, knobs, gauges, and graphs which can be “dropped” onto a GUI screen graphic with a software configuration “wizard”. These objects shall enable operators to interact with graphic displays in a manner that mimics their mechanical equivalents found on field-installed control panels. Using the mouse, operators shall be able to adjust setpoints, start or stop equipment, modify PID loop parameters, or change schedules.
      (c) Status changes or alarm conditions must be able to be highlighted by objects changing screen location, size, color, text, blinking or changing from one display to another.

(d) Ability to link graphic displays through user defined objects, alarm testing, or the result of a mathematical expression. Operators must be able to move from one graphic to another by selecting an object with a mouse - no menus will be required.
(e) If separate, provide a copy of the full GUI editing software on each workstation.

g. Automatic Monitoring
1) The software shall allow for the automatic collection of data and reports from any controller through either a hardwired or modem communication link. The frequency of data collection shall be completely user-configurable.

h. Alarm Management
1) The software shall be capable of accepting alarms directly from NACs and Local Controllers or generating alarms based on evaluation of data from these controllers and comparing to limits or conditional equations configured through the software. Any alarm (regardless of its origination) will be integrated into the overall alarm management system and will appear in all standard alarm reports, be available for operator acknowledgment, and have the option to display graphics, or reports.
2) Alarm management features shall include:
(a) A minimum of 255 alarm notification levels. Each notification level will establish a unique set of parameters to control alarm display, acknowledgment, keyboard annunciation, alarm printout and record keeping.
(b) Automatic logging in the database of the alarm message, point name, point value, connected controller, timestamp, username and time of acknowledgement, username and time of alarm silence (soft acknowledgement)
(c) Automatic printing of the alarm information or alarm report to an alarm printer or report printer.
(d) Playing an audible beep or audio (.wav) file on alarm initiation or return to normal.
(e) Sending an email or alphanumeric page to recipients listed in a workstation's email account address list on either the initial occurrence of an alarm and/or if the alarm is repeated because an operator has not acknowledged the alarm within a user-configurable timeframe. The ability to utilize email and alphanumeric paging of alarms shall be a standard feature of the software integrated with the operating system's Mail Application Interface (MAPI). No special software interfaces shall be required.
(f) Individual alarms shall be able to be re-routed to a workstation or workstations at user-specified times and dates. For example, a critical high temperature alarm can be configured to be routed to a Facilities Department workstation during normal working hours and to a Central Alarming workstation at all other times. Individual alarms shall be able to be forwarded directly to a Network Management System.
(g) Both the NAC and the Local Controller should forward alarms to the Network Management System (NMS) in the Data Center or Network Operations Center. Notification of these alarms should be provided as SNMP traps and have the ability to be sent via email, mobile phone, pager or PDA to the correct responder to critical facility issues. SNMP alarming shall be compatible with SNMPv1 and SNMPv2c protocols. No gateway devices for communication of alarms to the NMS shall be acceptable.
(h) An active alarm viewer shall be included which can be customized for each user or user type to hide or display any alarm attributes.

(i) The font type and color, and background color for each alarm notification level as seen in the active alarm viewer shall be customizable to allow easy identification of certain alarm types or alarm states.
(j) The active alarm viewer can be configured such that an operator must type in text in an alarm entry and/or pick from a drop-down list of user actions for certain alarms. This ensures accountability (audit trail) for response to critical alarms.

i. Custom Report Generation: The software will contain a built-in custom report generator, featuring word processing tools to create custom reports. These custom reports shall be able to be set up to automatically run or be generated on demand. Each workstation shall be able to associate reports with any word processing or spreadsheet program loaded on the machine. When the report is displayed, it will automatically spawn the associated report editor such as MS WordÔ.
   1) Reports can be of any length and contain any point attributes from any controller on the network.
   2) The report generator will have access to the user programming language in order to perform mathematical calculations inside the body of the report, control the display output of the report, or prompt the user for additional information needed by the report.
   3) It shall be possible to run other executable programs whenever a report is initiated.
   4) Report Generator activity can be tied to the alarm management system, so that any of the configured reports can be displayed in response to an alarm condition.
   5) Standard reports shall include:
      (a) Points in each controller.
      (b) Points in alarm
      (c) Disabled points
      (d) Overridden points
      (e) Operator activity report
      (f) Alarm history log.
      (g) Program listing by controller with status.
      (h) Network status of each controller
j. Spreadsheet-style reports
   1) The software shall allow the simple configuration of row/column reports (spreadsheet-style) on any class of object in the system. These reports shall be user-configurable and shall be able to extract live (controller) data and/or data from the database. The user shall be able to set up each report to display in any text font, color and background color. In addition the report shall be able to be configured to filter data, sort data and highlight data which meets user-defined criteria.
k. HTML Reporting
   1) The above spreadsheet-style reports shall be able to be run to an HTML template file. This feature will create an HTML “results” file in the directory of the HTML template. This directory can be shared with other computer users, which will allow those users with access to the directory to “point” their web browser at the file and view the report.
   2) Other report formats shall be able to be used include Business Objects Crystal Reports, PDF, Adobe Acrobat, Microsoft Access and Microsoft Excel.
l. Scheduling
   1) It shall be possible to configure and download from the workstation schedules for any of the controllers on the network.
      (a) Time of day schedules shall be in a calendar style and shall be programmable for a minimum of one year in advance. Each standard day of the week and user-defined day types shall be able to be associated with

a color so that when the schedule is viewed it is very easy, at-a-glance, to determine the schedule for a particular day even from the yearly view. To change the schedule for a particular day, a user shall simply click on the day and then click on the day type.

(b) Each schedule will appear on the screen viewable as the entire year, monthly, week and day. A simple mouse click shall allow switching between views. It shall also be possible to scroll from one month to the next and view or alter any of the schedule times.

(c) Schedules will be assigned to specific controllers and stored in their local RAM memory. Any changes made at the workstation will be automatically updated to the corresponding schedule within the controller.

m. Programmer's Environment

1) The programmer's environment will include access to a superset of the same programming language supported in the controllers. Here the programmer will be able to configure application software off-line (if desired) for custom program development, write global control programs, system reports, wide area networking data collection routines, and custom alarm management software. On the same screen as the program editor, the programming environment shall include dockable debug and watch bars for program debugging and viewing updated values and point attributes during programming. In addition, a wizard tool shall be available for loading programs from a library file in the program editor.

n. Saving/Reloading

1) The workstation software shall have an application to save and restore field controller memory files. This application shall not be limited to saving and reloading an entire controller – it must also be able to save/reload individual objects in the controller. This allows off-line debugging of control programs, for example, and then reloading of just the modified information.

o. Data Logging

1) The workstation software shall have the capability to easily configure groups of data points with trend logs and display the trend log data. A group of data points shall be created by drag-and-drop method of the points into a folder. Trend log data shall be displayed through a simply menu selection, or from a hot spot on a graphic display. This data shall be able to be saved to file and/or printed.

p. Audit Trail

1) The workstation software shall automatically log and timestamp every operation that a user performs at a workstation, from logging on and off a workstation to changing a point value, modifying a program, enabling/disabling an object, viewing a graphic display, running a report, modifying a schedule, etc.

G. DDC SENSORS AND POINT HARDWARE

1. General: Where indicated on the drawings, schedules or sequence of operations, provide equipment that conforms to the following specifications:
2. Temperature Sensors:
   a. All temperature devices shall use precision thermistors accurate to +/- 0.36°F over a range of –30 to 230°F.
   b. Standard space sensors shall be provided in an off white enclosure for mounting on a standard electrical box.
   c. Where manual override of unoccupied mode of control is indicated on the drawings or sequence of operation, provide a push button for selecting after hours operation.
   d. Duct temperature sensors shall incorporate a thermistor bead embedded at the tip of a stainless steel tube. Probe style duct sensors shall be used in air handling applications where the air stream temperature is consistent and is not stratified.
   e. Averaging sensors shall be employed in all mixing plenum applications and in any other application where the temperature might otherwise be stratified. The averaging sensor tube shall contain at least four thermistor sensors.

f. Immersion sensors shall be employed for measurement of temperature in all chilled water, hot water and glycol applications. Thermal wells shall be brass or stainless steel for non-corrosive fluids below 250 degrees F and 300 series stainless steel for all other applications.

3. Pressure Sensors:
   a. Air pressure or differential air pressure measurements in the range of 0 to 10" water column shall be accurate to +/- 1% of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Acceptable manufacturer shall be Setra model C-264.
   b. Liquid pressure or differential liquid pressure measurements shall be accurate to +/- 0.25% of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Unit shall be provided with isolation and bypass manifold for start-up and maintenance operations. Acceptable manufacturer shall be Setra model C-230.
4. Low Limit Thermostats:
   a. Safety low limit thermostats shall be vapor pressure type with a 20 foot minimum element. Element shall respond to the lowest temperature sensed by any one foot section. Provide one thermostat for each 25 square foot of coil area.
   b. Low limit thermostat shall be manual reset and shall be double pole so as to provide input capability for alarm at the BAS.
5. Current Sensing Status Switches
   a. Current status switches shall be used to monitor the run status of fans, pumps, motors and electrical loads. Acceptable manufacturer is Veris or approved equal.
6. Current Measurement Devices
   a. Measurement of three-phase power shall be accomplished with a kW/kWh transducer. The instrument shall utilize direct current transformer inputs to calculate the instantaneous value (kW) and a pulsed output proportional to the energy usage (kWh). Provide Veris Model 6000 Power Transducer or approved equal.
7. Carbon Monoxide Sensing Devices
   a. Wall mounted carbon monoxide (CO) sensor shall be microprocessor based (12 bit accuracy) and shall monitor CO over a range of 0-300 PPM (optional 200-500 PPM). The device shall have an accuracy of +/-3% (electrochemical type) or +/-5% (solid state type) and operate within the range of 32-122°F and 0-95% RH. The sensor shall have a calibration accuracy of 0.5%. Where required by the drawings or specifications, provide an LCD display for displaying PPM level and system configuration information and/or audible alarm with programmable trip point and disable jumper. Greystone Product # CMD or equivalent.
8. Control Valves
   a. Provide automatic control valves suitable for the specified controlled media (steam, water or glycol). Provide valves that mate and match the material of the connected piping.
   b. Control valves shall meet the heating and cooling loads specified, and close off against the differential pressure conditions within the application. Valves should be sized to operate accurately and with stability from 10 to 100% of the maximum design flow. Valves shall be selected to provide an initial pressure drop of not more than 4 psig for water applications. For low pressure steam application, the pressure drop shall be equal to the supply pressure minus the heating element design inlet pressure.
   c. Normal position of both heating and cooling valves shall be open. Three Way valves shall be piped to fail open to both heating and cooling.
   d. Electric Bi-Directional actuators are acceptable on VAV Terminal Units and Reheat coil valve control if so noted.
   e. All electric actuators for applications other than VAV terminal units and Reheat Coil valve Control shall be Proportional analog 4-20Ma or 0-10Vdc input and shall be positioned to reflect the output value of the computer control system and shall be spring return to normal position.

9. Dampers
    a. Automatic dampers, furnished by the Building Automation Contractor shall be single or multiple blade as required. Dampers shall be installed by the HVAC Contractor under the supervision of the BAS Contractor. All blank-off plates and conversions necessary to install smaller than duct size dampers are the responsibility of the Sheet Metal Contractor.
    b. Damper frames shall be hat shaped channel, 4” deep constructed of 16 gauge galvanized steel. Stainless steel side seals, and sintered bronze, oil-impregnated bearings shall also be provided.
    c. Damper blades shall be 16 gauge galvanized steel and shall be 6” on center. Provide vinyl-grip seals on blades.
    d. Provide damper linkage that consists of 0.50” diameter steel, cadmium plated and chromate treated pivots. Provide a ¼-20 set-screw with a locking-patch to lock the pivots to a 0.31 diameter aluminum rod. Pivots shall rotate in a Celcon bearing. Blade brackets shall be 12 gauge cadmium plated steel. Blades shall be individually factory adjusted for maximum shut off.
    e. Provide axles that are steel, 0.350” diameter cadmium plated and driveshafts that are ½” diameter cadmium plated steel, extendable 6”.
    f. For high performance applications, control dampers shall meet or exceed the UL Class I leakage rating.
    g. Control dampers shall be Ruskin, Arrow or approved equal.
    h. Unless otherwise noted, provide opposed blade dampers for modulating applications and parallel blade for two-position control.

PART 3 - EXECUTION

3.1 CONTRACTOR RESPONSIBILITIES

A. Demolition: Remove controls which do not remain as part of the building automation system, including all associated abandoned wiring, conduit, and pneumatic tubing. The Owner will inform the Contractor of any equipment that is to be removed that will remain the property of the Owner. This equipment shall be handled with care so as not to damage it. All other equipment that is removed shall be disposed of by the Contractor.

B. Cleanup: At the completion of the work, all equipment pertinent to this section shall be checked and thoroughly cleaned, and all other areas shall be cleaned around equipment provided under this section. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.

C. WIRING, CONDUIT AND CABLE
    1. ALL wiring (high voltage, 50 volts and greater) and conduit is to be installed in accordance with local and national electrical codes and Division 26 (Electrical division) specification.
        a. All temperature control cable less than 50 volts is to be considered low voltage.
        b. All low voltage cable is to be run in conduit in any non-accessible concealed space and up to 10 ft. above floor level within mechanical rooms. Wiring above 10 ft or within accessible areas (ceilings, crawl spaces) may be run exposed with proper support with bridle rings. Wiring is to be run parallel and perpendicular to building lines in a neat and workmanlike manner and bundled with nylon tie wraps.
        c. Conduit sleeves shall be run through any concrete or block walls for low voltage cable to be run through such walls.
        d. All low voltage cable shall be run separate from high voltage cable. All microprocessor communications cable shall be run separate from any low or high voltage cable.
        e. Any cable running in plenum rated areas shall be plenum rated cable.

f. Coaxial cable shall conform to RG62 or RG59 rating. Provide plenum rated coaxial cable when running in return air plenums.
g. Fiber optic cable shall include the following sizes; 50/125, 62.5/125 or 100/140.
h. Only glass fiber is acceptable, no plastic will be allowed.
i. Fiber optic cable shall only be installed and terminated by an experienced contractor.
j. Wires and tubing shall be installed a minimum of three (3) inches from hot water, steam, or condensate piping.
k. A true earth ground shall be available in the building. Ground shall be run from the source electrical panel ground to each temperature control panel or controller.
l. Metallic surface raceway may be used in finished areas on non accessible masonry walls AS APPROVED BY OWNER AND/OR ARCHITECT/ENGINEER. All surface raceway in finished areas shall be color matched to the existing finish within the limitations of standard manufacturers colors.

D. HARDWARE INSTALLATION
1. Installation Practices for Field Devices
a. Actuators shall be firmly mounted to give positive movement, and linkage shall be adjusted to give smooth continuous movement throughout 100 percent of the actuator stroke.
b. Actuators shall be stroked ~5%, tightened and returned to normal position to give a positive seal.
c. Relay outputs shall include transient suppression across all coils. Suppression devices shall limit transients to 150% of the rated coil voltage.
d. Water line mounted sensors shall be removable without shutting down the system in which they are installed.
e. For duct static pressure sensors, the high pressure port shall be connected to a metal static pressure probe inserted into the duct pointing upstream. The low pressure port shall be left open to the plenum area at the point that the high pressure port is tapped into the ductwork.
f. For building static pressure sensors, the high pressure port shall be inserted into the space via a metal tube. The low pressure port shall be piped to the outside of the building.
2. Enclosures:
a. For all I/O requiring field interface devices, these devices where practical shall be mounted in a field interface panel (FIP). The Contractor shall provide an enclosure that protects the device(s) from dust and moisture, and conceals integral wiring and moving parts.
b. FIPs shall contain power supplies for sensors, interface relays and contactors, safety circuits, and I/P transducers.
c. The FIP enclosure shall be of steel construction with baked enamel finish, NEMA 1 rated with a hinged door and keyed lock. All locks shall be keyed identically.
d. All outside mounted enclosures shall meet the NEMA-4 rating.

E. SOFTWARE INSTALLATION
1. General: The Contractor shall provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third party software necessary for successful operation of the system.
2. Database Configuration: The Contractor shall provide all labor to configure those portions of the database that are required by the point list and sequence of operation.
3. Color Graphic Slides: Unless otherwise directed by the owner, the Contractor shall provide color graphic displays as depicted in the schematic drawings for each system and floor plan. For each system or floor plan, the display shall contain the associated points identified in the point list and allow for setpoint changes as required by the owner.
4. Reports: The Contractor shall configure a minimum of 4 reports for the owner as listed below:

a. Air Handler Status Report
b. UV Status Report
c. Space Temperature Report
d. Specialty Equipment Status Report

5. Documentation: As built software documentation shall be provided on a CD and include the following:
   a. Descriptive point lists
   b. Application program listing
   c. Application programs with comments.
   d. Printouts of all reports.
   e. Alarm list.
   f. Printouts of all graphics

F. COMMISSIONING AND SYSTEM STARTUP

1. Point to Point Checkout: Each I/O device (both field mounted and those located in FIPs) shall be inspected and verified for proper installation and functionality. A checkout sheet itemizing each device shall be filled out, dated and approved by the Project Manager for submission to the owner or owner's representative.
2. Controller and Workstation Checkout: A field checkout of all controllers and front-end equipment (computers, printers, modems, etc.) shall be conducted to verify proper operation of both hardware and software. A checkout sheet itemizing each device and a description of the associated tests shall be prepared and submitted to the owner or owner's representative by the completion of the project.
3. System Acceptance Testing:
   a. All application software shall be verified and compared against the sequences of operation. Control loops shall be exercised by inducing a setpoint shift of at least 10% and observing whether the system successfully returns the process variable to setpoint. Record all test results and attach to the Test Results Sheet.
   b. Test each alarm in the system and validate that the system generates the appropriate alarm message, that the message appears at all prescribed destinations (workstations or printers), and that any other related actions occur as defined (i.e. graphic panels are invoked, reports are generated, etc.). Submit a Test Results Sheet to the owner.
   c. Perform an operational test of each unique graphic display and report to verify that the item exists, that the appearance and content are correct, and that any special features work as intended. Submit a Test Results Sheet to the owner.
   d. Perform an operational test of each third party interface that has been included as part of the automation system. Verify that all points are properly polled, that alarms have been configured, and that any associated graphics and reports have been completed. If the interface involves a file transfer over Ethernet, test any logic that controls the transmission of the file, and verify the content of the specified information.

END OF SECTION

SECTION 23 09 93
SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sequence of operation for:
   1. Time Schedule Programs
   2. Alarm Points.
   3. Optimum start-stop.
   4. Setbacks
   5. Maintenance Management
   6. Scheduling
   7. Economizer Description
   8. Constant Volume Air Handling Unit (heating, cooling, ventilating)
   9. Constant Volume Blower Coil Unit (heating, cooling, ventilating)
   10. Rooftop Unit (Heating, Cooling, Ventilating)
   11. Exhaust Fan Control
   12. Relief Hood Control

1.2 RELATED REQUIREMENTS:

A. Section 23 09 23 - Direct-Digital Control System for HVAC: For equipment, devices, system components, and software to implement sequences of operation.

1.3 SUBMITTALS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Shop Drawings: Indicate mechanical system controlled and control system components.
   1. Label with settings, adjustable range of control and limits. Submit written description of control sequence.
   2. Submit flow diagrams for each control system, graphically depicting control logic.
   3. Submit draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
   4. Coordinate submittals with information requested in Section 23 09 23.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of components and set points of controls, including changes to sequences made after submission of shop drawings.

PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 TIME SCHEDULE PROGRAMS

A. The programs for the EMS shall schedule each systems operation on an hourly basis controlled through daily, weekly and/or monthly schedules. Schedules for each individual system, room or area shall be easily programmed and modified by the user on a calendar-like display at the host computer.

B. The programs shall store 60 months of schedules.

C. An internal time clock shall automatically compensate for daylight savings time and calendars generated by software shall automatically compensate for leap years.

3.2 ALARM POINTS

A. All temperature inputs to the DDC system (space, return air, mixed air, discharge air) shall be alarmed at the host computer if the temperature is out of range 10° F. (adj.) above or below setpoint.

B. Fan status shall be monitored by a current sensing switch or differential pressure switch. If the fan is scheduled to run and the status is not proven, an alarm condition shall be shown at the host computer.

C. Other alarm points are specifically addressed per individual sequences of operation.

D. All points can be individually alarmed as required by owner’s staff.

3.3 OPTIMUM START PROGRAM

A. Each system shall have independent modular program.

B. The program shall minimize the total energy consumption during daily start-up of each heating/cooling system.

C. A control algorithm shall compare the outside air temperature to space temperature to calculate start time for each air handling system.

D. The start time for each system shall bring its respective zone to occupied setpoint at the time of occupied mode start.

E. The optimum start program shall be adjustable to the rate structure of the local energy company.

3.4 OPTIMUM STOP PROGRAM

A. Each system shall have independent modular program.

B. The program shall minimize the total energy consumption during daily shut-down of each heating/cooling system. A control algorithm shall compare the outside air temperature to space temperature to calculate a stop time for each air handling system.

C. The stop time for each system shall shut-down its respective zone as early as possible without letting the temperature drift out of the specified comfort range.

3.5 DAY/NIGHT SETBACK

A. The day/night setback will consist of lowering the space heating setpoint and raising the space cooling setpoint during the unoccupied mode, thereby reducing the heating and cooling energy requirements. The occupied and unoccupied areas will be specified by the owner, and will be coordinated with the control system.

3.6 MAINTENANCE MANAGEMENT

A. The control system will continuously totalized hours for selected equipment controlled and/or monitored for use by the maintenance management program.

3.7 EQUIPMENT SCHEDULING

A. Equipment shall be 7 days, 24 hours schedules with separate holiday hours.

B. There shall be capability for five different holiday schedules which can be selected from the occupancy schedule graphic.

C. Holidays shall be programmed so that they shall need a minimum of manual adjustment year to year, and can easily be modified at front end if necessary.

D. All schedule programming shall reside in local controllers, but shall be configurable from the front end.

3.8 ECONOMIZER DESCRIPTION

A. Economizer Sequence:
   1. The economizer shall be enabled anytime the unit is in the cooling mode. The economizer shall open the outside air damper to cool the space until the outdoor air enthalpy exceeds return air enthalpy or the outdoor air temperature exceeds 75 degrees F. Once one of the two conditions are met then the unit shall change to mechanical cooling mode.

B. Economizer Fault Detection:
   1. The following temperature sensors shall be permanently installed to monitor system operation:
      a. Outside air.
      b. Supply air.
      c. Return air.
   2. Temperature sensors shall have an accuracy of +/- 2 degrees F over the range of 40 degrees F to 80 degrees F.
   3. Refrigerant pressure sensors, where used, shall have an accuracy of +/- 3% of full scale.
   4. The unit controller shall be configured to provide system status by indicating the following:
      a. Free cooling available.
      b. Economizer enabled.
      c. Compressor enabled.
      d. Heating enabled.
      e. Mixed air low limit cycle active.
      f. The value of each sensor.
   5. The unit controller shall be capable of manually initiated each operating mode so that the operation of compressors, economizers, fans and the heating system can be independently tested and verified.

6. The unit shall be configured to report faults to a fault management application availible for access by day-to-day operating or service personnel, or annunciated locally on zone thermostats.
7. The fault detection and diagnostics system shall be configured to detect the following faults:
   a. Air temperature sensor failure/fault.
   b. Not economizing when the unit should be economizing.
   c. Economizing when the unit should not be economizing.
   d. Damper not modulating.
   e. Excess outdoor air.

3.9 CONSTANT VOLUME AIR HANDLING UNIT (HEATING, COOLING, VENTILATING):

A. General:
   1. Unit automatically indexed to "occupied" or "unoccupied" cycle by the DDC.
   2. Unit automatically switches from heating to cooling modes.

B. Heating Mode:
   1. Occupied cycle:
      a. Supply air fan shall run continuously.
      b. The outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall modulate correspondingly.
      c. On a fall in space temperature, the heating coil valve shall modulate open.
      d. Upon a rise in space temperature the duct mounted heating control valve shall close.
      e. Upon a still further rise in space temperature, the unit mounted outdoor air damper shall modulate open under economizer control to satisfy the space setpoint. The unit return air damper shall modulate closed
      f. A mixed air low limit controller shall assume control of dampers and valves as required to maintain the desired minimum mixed air temperature.
   2. Unoccupied cycle:
      a. The outdoor air damper shall remain fully-closed, return air damper fully-open, unit heating coil valve fully-open, and the supply air fan shall run intermittently at demand of room sensor to maintain reduced space temperature.

C. Cooling Mode:
   1. Occupied cycle:
      a. Supply air fan shall run continuously.
      b. The heating valve shall be closed.
      c. The outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall close correspondingly.
      d. On a rise in space temperature, the unit mounted outdoor air damper shall modulate open under control of the economizer control. The unit return air damper shall modulate closed.
   2. Unoccupied cycle:
      a. The unit shall be disabled.

D. Fire shut down shall be provided by the EC via the fire alarm system and by the DDC. When unit is shut down, the outside air dampers shall close and the mixing dampers shall position to 100% return air.
   1. Variable Volume Air Handling Unit (cooling, reheat, ventilating)

3.10 CONSTANT VOLUME BLOWER COIL UNIT (HEATING, COOLING, VENTILATING):

A. General:
   1. Unit automatically indexed to "occupied" or "unoccupied" cycle by the DDC.
   2. Unit automatically switches from heating to cooling modes.

B. Heating Mode:
   1. Occupied cycle:
      a. Supply air fan shall run continuously.
      b. The BCU outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall modulate correspondingly.
      c. On a fall in space temperature, the unit heating coil valve shall modulate open.
      d. Upon a rise in space temperature the heating control valve shall close.
      e. Upon a still further rise in space temperature, the unit mounted outdoor air damper shall modulate open under economizer control to satisfy the space setpoint. The unit return air damper shall modulate closed, and the airflow station control shall send a signal to increase fan speed of AHU-1 to provide more outside air for economizer cooling.
      f. A mixed air low limit controller shall assume control of dampers and valves as required to maintain desired minimum mixed air temperature.
   2. Unoccupied cycle:
      a. The outdoor air damper shall remain fully-closed, return air damper fully-open, unit heating coil valve fully-open, and the supply air fan shall run intermittently at demand of room sensor to maintain reduced space temperature.

C. Cooling Mode:
   1. Occupied cycle:
      a. Supply air fan shall run continuously.
      b. The heating valve shall be closed.
      c. The outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall close correspondingly.
      d. On a rise in space temperature, the unit mounted outdoor air damper shall modulate open under control of the economizer control. The unit return air damper shall modulate closed.
   2. Unoccupied cycle:
      a. The unit shall be disabled.

D. Fire shut down shall be provided by the EC via the fire alarm system and by the DDC. When unit is shut down, the outside air dampers shall close and the mixing dampers shall position to 100% return air.

3.11 DEMAND CONTROL VENTILATION (UNITS SERVING SPACES EQUIPPED WITH CO2 SENSORS)

A. Ventilation Control
   1. 30 minutes prior to scheduled occupancy a preoccupancy purge cycle shall occur for 30 minutes with the outside air damper open to the ventilation rate as scheduled.
   2. The DDC system shall modulate the outdoor air, return air, and relief air dampers to maintain the preset CO2 level in the space or provide 20% of the scheduled outside air, whichever is greater. The CO2 level in the space shall be determined by averaging the CO2 sensor readings within the space.
   3. The economizer function shall override the ventilation control when free cooling is available.
   4. The outside air damper shall modulate open beyond the minimum setting starting at an interior CO2 consentration of not greater than 100 ppm over that of the outside air in any space served and be open for full occupancy when CO2 concentrations reach the upper limit of 500 ppm above ambient conditions in any space served.
   5. Post purge cycle shall occur when the space goes from occupied to unoccupied. The occupied mode shall not change to unoccuped mode untill the space CO2 level drops to ambient level.
   6. In all cases the CO2 sensors in spaces with the highest ppm level shall control ventilation.

3.12 ROOFTOP AIR HANDLING UNITS & SPLIT AC UNITS

A. General:
   1. Provide Packaged controls as specified above and on the drawing schedule.
   2. Provide DDC controls, and interlocks in addition to packaged controls as required.
   3. Provide status and alarm points to biulding DDC.
      a. Status points: room temp, room temp set point, fan on / off status, fan speed, OA & RA damper position, burner stauts, DX clg stauts.
      b. Alarm points: fan failure, high temperatur alarm (IT / Server rooms only)
   4. Unit shall run continuously in "occupied" mode during normal operating hours.

B. Heating / Cooling Mode:
   1. Occupied cycle:
      a. The outdoor air damper shall open.
      b. Supply air fan shall run continuously.
      c. On a fall in space temperature, the main burner(s) shall fire and modulate to maintain space temperature setpoint (72 degF adj.).
      d. Upon a rise in space temperature setpoint the main burner gas valve shall modulate closed.
      e. Upon a still further rise in space temperature, if the outside air temperature is below the economizer change over point, the unit mounted outdoor air damper shall modulate open under economizer control to satisfy the space setpoint.
      f. Upon a still further rise in space temperature, the DX cooling stages shall be enabled and modulate to maintain space temperature setpoint (75 degF adj.).

C. Fire shut down shall be provided by the EC and DDC. When unit is shut down, the outside air dampers shall close.

3.13 ENERGY RECOVERY VENTILATION UNIT (DEDICATED OUTDOOR AIR SYSTEM)

A. General:
   1. Unit automatically indexed to "occupied" or "unoccupied" cycle by the DDC.
   2. Unit automatically switches from heating to cooling modes.

B. Heating Mode:
   1. Occupied mode
      a. Supply and return fan shall run continuously.
      b. The rooftop unit outdoor air damper shall fully open, the return air damper shall fully close and the exhaust air damper shall fully open.
      c. The duct mounted electric coil shall energize to produce a constant discharge air temperature of 65 degrees (adjustable).
   2. Unoccupied mode
      a. The outdoor air damper shall remain fully-closed, return air damper fully-open, exhaust air damper fully closed, and an integral thermostat continues fan operation until element temperature falls below 100 degrees F.

C. Cooling Mode
   1. Occupied mode
      a. Supply and return fan shall run continuously.
      b. The rooftop unit outdoor air damper shall fully open, the return air damper shall fully close and the exhaust air damper shall fully open.
   2. Unoccupied mode
      a. The unit is inoperable

D. Fire shut down shall be provided by the EC via the fire alarm system and by the DDC. When unit is shut down, the outside air dampers shall close and the mixing dampers shall position to 100% return air.

3.14 UNIT VENTILATOR (HEATING, COOLING, VENTILATING)

A. General:
   1. Unit automatically indexed to "occupied" or "unoccupied" cycle by the DDC.
   2. Unit automatically switches from heating to cooling modes.

B. Heating Mode:
   1. Occupied cycle:
      a. Supply air fan shall run continuously.
      b. The outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall close correspondingly.
      c. On a fall in space temperature, the heating coil valve shall modulate open.
      d. Upon a rise in space temperature the control valve shall close.
      e. Upon a still further rise in space temperature, the unit mounted outdoor air damper shall modulate open under economizer control to satisfy the space setpoint.
      f. A mixed air low limit controller shall assume control of dampers and valves as required to maintain desired minimum mixed air temperature.
      g. A separate low limit sensor (discharge air) shall be installed with sensing element serpentine across the face of the coil, which shall assume control of the dampers and control valve. The outdoor air damper shall close and the return air damper shall open 100% open. The unit mounted control valve shall open 100% to the coil
   2. Unoccupied cycle:
      a. The outdoor air damper shall remain fully-closed, return air damper fully-open, heating coil valve fully-open, and the supply air fan shall run intermittently at demand of room sensor to maintain reduced space temperature.

C. Cooling Mode:
   1. Occupied cycle:
      a. Supply air fan shall run continuously.
      b. The outdoor air damper shall fully open to admit preset minimum quantity of outdoor air; return air damper shall close correspondingly.
      c. On a rise in space temperature, the unit mounted outdoor air damper shall modulate open under control of the economizer control.
   2. Unoccupied cycle:
      a. The unit is inoperable.

D. Fire shut down shall be provided by the EC via the fire alarm system and by the DDC. When unit is shut down, the outside air dampers shall close and the mixing dampers shall position to 100% return air.

3.15 RELIEF HOOD CONTROL

A. The DDC system shall modulate the relief hood dampers to match the outside air damper position of the associated air delivery equipment.

3.16 EXHAUST FAN CONTROL

A. Exhaust fans shall be controlled by wall mounted starters/switches, thermostats or shall be started and stopped by the DDC system. Refer to schedule for related control schemes.
   1. If the fan to run by the DDC system and run indication is not met after 2 minutes or fan run indication fails after being proven, an alarm shall be generated at the operator workstation. The call to run shall be turned off.

2. All fans over 1000 CFM and serving more than one space shall be provided with fire shut downs provided by the EC via the fire alarm system. All fans under DDC control shall also shut-down. When the exhaust fan is shut down from fire alarm, the automatic air dampers shall close.

END OF SECTION

SECTION 23 21 13
HYDRONIC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic system requirements.

B. Heating water piping, buried.

C. Heating water piping, above grade.

D. Equipment drains and overflows.

E. Pipe hangers and supports.

F. Unions, flanges, mechanical couplings, and dielectric connections.

G. Valves:
   1. Ball valves.
   2. Butterfly valves.
   3. Check valves.

1.2 RELATED REQUIREMENTS

A. Section 23 05 53 - Identification for HVAC Piping and Equipment.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 25 00 - HVAC Water Treatment: Pipe cleaning.

1.3 REFERENCE STANDARDS

A. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.

E. ASME B31.9 - Building Services Piping; 2017.

F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2019.

I. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

J. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.

K. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.

L. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).

M. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.

N. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2017.

O. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2015.

P. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.

Q. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992,with Editiorial Revision (2018).

R. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2013).

S. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).

T. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

U. AWWA C606 - Grooved and Shouldered Joints; 2015.

V. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.

C. Product Data:
   1. Include data on pipe materials, pipe fittings, valves, and accessories.
   2. Provide manufacturers catalog information.
   3. Indicate valve data and ratings.
   4. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.

D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

E. Project Record Documents: Record actual locations of valves.

F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Valve Repacking Kits: One for each type and size of valve.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum five years of experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.8 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

1.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for valves excluding packing.

1.12 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two packing kits for each size and valve type.

PART 2 PRODUCTS

2.1 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:
   1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
   2. Use non-conducting dielectric connections whenever jointing dissimilar metals.

3. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated:
1. Provide drain valves where indicated, and if not indicated, provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
3. For throttling, bypass, or manual flow control services, use globe, ball, or butterfly valves.
4. In heating water, chilled water, or condenser water systems, butterfly valves may be used interchangeably with gate and globe valves.
5. For shut-off and to isolate parts of systems or vertical risers, use gate, ball, or butterfly valves.

E. Welding Materials and Procedures: Comply with ASME BPVC-IX.

2.2 HEATING WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
2. Threaded Joints: ASME B16.3, malleable iron fittings.

B. Steel Pipe Sizes 12 Inches and Greater: ASTM A53/A53M, 3/8 inch wall, black, using one of the following joint types:
1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

C. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn, using one of the following joint types:
1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

2.3 EQUIPMENT DRAINS AND OVERFLOWS

A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:

B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn; using one of the following joint types:
1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

C. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
1. Fittings: ASTM D2466 or D2467, PVC.
2. Joints: Solvent welded in accordance with ASTM D2855.

2.4 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2 Inches and Greater: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

E. Hangers for Hot Pipe Sizes 6 Inches and Greater: Adjustable steel yoke, cast iron roll, double hanger.

F. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

G. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Greater: Steel channels with welded spacers and hanger rods, cast iron roll.

H. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

I. Wall Support for Pipe Sizes 4 Inches and Greater: Welded steel bracket and wrought steel clamp.

J. Wall Support for Hot Pipe Sizes 6 Inches and Greater: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.

K. Vertical Support: Steel riser clamp.

L. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

M. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge-shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

N. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
   1. Bases: High-density polypropylene.
   2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   3. Steel Components: Stainless steel or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion-resistant material.
   5. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

2.5 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe of 2 Inches and Less:
   1. Ferrous Piping: 150 psi brass or malleable iron, threaded.
   2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe 2 Inches and Greater:
   1. Ferrous Piping: 150 psig forged steel, slip-on.
   2. Copper Piping: Bronze.
   3. Gaskets: 1/16 inch thick, preformed neoprene.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
   1. Dimensions and Testing: In accordance with AWWA C606.

2. Mechanical Couplings: Comply with ASTM F1476.
3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

2.6 BALL VALVES

A. Up To and Including 2 Inches:
1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

2.7 BUTTERFLY VALVES

A. Body: Cast or ductile iron with resilient replaceable EPDM seat, wafer or lug ends, extended neck.

B. Disc: Construct of aluminum bronze, chrome plated ductile iron, stainless steel, ductile iron with EPDM encapsulation, or Buna-N encapsulation.

C. Operator: 10 position lever handle.

2.8 SWING CHECK VALVES

A. Up To and Including 2 Inches:
1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder or threaded ends.

B. Over 2 Inches:
1. Iron body, bronze trim, bronze or bronze faced rotating swing disc, renewable disc and seat, flanged ends.

2.9 SPRING LOADED CHECK VALVES

A. 2 inches and Smaller: MSS SP 80, Class 250, bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, solder or threaded ends.

B. 2-1/2 inches and Larger: MSS SP 71, Class 125, wafer style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare piping connections to equipment using jointing system specified.

E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

F. After completion, fill, clean, and treat systems. See Section 23 25 00 for additional requirements.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

C. Route piping in orderly manner, parallel to building structure, and maintain gradient.

D. Install piping to conserve building space and to avoid interference with use of space.

E. Group piping whenever practical at common elevations.

F. Sleeve pipe passing through partitions, walls, and floors.

G. Slope piping and arrange to drain at low points.

H. Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
2. Support horizontal piping as scheduled.
3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inches minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. See Section 09 91 23. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 23 07 19.

J. Use eccentric reducers to maintain top of pipe level.

K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.

L. Install valves with stems upright or horizontal, not inverted.

3.3 TESTING

A. All piping shall be tested in accordance with the applicable Mechanical Code.

B. Hydronic piping shall be tested hydrostatically at one and one half times the maximum system design pressure, but not less than 100 psi. Test duration shall be no less than 15 minutes.

3.4 SCHEDULES

A. Hanger Spacing for Copper Tubing.
1. 1/2 Inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. 1 Inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. 1-1/2 Inches and 2 Inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
4. 2-1/2 Inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
5. 3 Inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
6. 4 Inches: Maximum span, 12 feet; minimum rod size, 1/2 inch.
7. 6 Inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.

B. Hanger Spacing for Steel Piping.
   1. 1/2 Inch, 3/4 Inch, and 1 Inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
   2. 1-1/4 Inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   3. 1-1/2 Inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
   4. 2 Inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
   5. 2-1/2 Inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
   6. 3 Inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
   7. 4 Inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
   8. 6 Inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.

END OF SECTION

SECTION 23 21 14
HYDRONIC SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Expansion tanks.

B. Air vents.

C. Air separators.

D. Strainers.

E. Magnetic filters.

F. Suction diffusers.

G. Automatic flow control valves.

H. Flow meters.

I. Relief valves.

J. Glycol system.

1.2 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

1.3 REFERENCE STANDARDS

A. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2017.

B. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2019.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.

C. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

D. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.5 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum week prior to commencing work of this section.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not install instruments when areas are under construction, except rough in, taps, supports and test plugs.

1.7 FIELD MEASUREMENTS

A. Verify field measurements before fabrication.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for piping specialties.

1.9 MAINTENANCE SERVICE

A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance service.

B. Furnish service and maintenance of glycol fluid and glycol charging components for two years from Date of Substantial Completion.

C. Furnish monthly visit for one year starting from Date of Substantial Completion to make glycol fluid concentration analysis on site with refractive index measurement instrument. Detail findings with maintenance personnel in writing of corrective actions needed including analysis and amounts of glycol or water added.

1.10 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two bottles of red gage oil for static pressure gages.

C. Furnish two pressure gages with pulsation damper and two thermometers .

1.11 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 STRAINERS

A. Size 2 inch and Under:
   1. Provide threaded, grooved, or sweat brass or iron body for up to 175 psi working pressure, Y-pattern strainer with 1/32 inch stainless steel perforated screen.

B. Size 2-1/2 inch to 4 inch:
   1. Provide flanged or grooved iron body for 175 psi working pressure, Y pattern with 1/16 inch, or 3/64 inch stainless steel perforated screen.

C. Size 5 inch and Larger:
   1. Provide flanged or grooved iron body for 175 psi working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

2.2 MAGNETIC FILTERS

A. Description: ASME BPVC-VIII-1 compliant, packaged oxide filtration assembly configured to remove dissolved ferrous metals from hydronic systems.

B. In-line Filter Assembly:
   1. Magnetic belt surrounded by stainless steel vessel and nonferrous casing.
   2. Provide filter assembly with automatic air vent and EPDM flange gaskets.
   3. Flange Connections: 2 inches, ASME B16.5 Class 150.
   4. Maximum Fluid Service Pressure: 145 psi.
   5. Maximum Temperature: 212 degrees F.

2.3 SUCTION DIFFUSERS

A. Fitting: Angle pattern, cast-iron body, threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger, rated for 175 psi working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable 5/32 inch mesh strainer to fit over cylinder strainer, 20 mesh startup screen, and permanent magnet located in flow stream and removable for cleaning.

B. Accessories: Adjustable foot support, blowdown tapping in bottom, gauge tapping in side.

2.4 AUTOMATIC FLOW CONTROL VALVES

A. Construction:
   1. Brass, bronze, or iron body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet with blowdown/backflush drain.
   2. Built-in lug-type outlet butterfly valve with 2-position handle.

B. Calibration: Control flow within 10 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, minimum pressure 2 psi.

C. Control Mechanism: Provide stainless steel or nickel-plated, brass piston or regulator cup, operating against stainless steel helical or wave formed spring or elastomeric diaphragm and polyphenylsulfone orifice plate.

D. Size: Match system flow capacity.

E. Accessories: Provide hanging tag, inlet in-line strainer, outlet ball valve, and PT test plug extension.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.

3.2 INSTALLATION - HYDRONIC PIPING SPECIALTIES

A. Refer to drawing for required specialties.

B. Locate test plugs adjacent to thermometers and thermometer sockets and adjacent to pressure gages and pressure gage

C. Where large air quantities accumulate, provide enlarged air collection standpipes.

D. Install manual air vents at system high points.

E. For automatic air vents in ceiling spaces or other concealed locations, install vent tubing to nearest drain.

F. Provide air separator on suction side of system circulation pump

G. Connect to expansion tank to system by pipe connected of the bottom of the pump suction line.

H. Provide drain and hose connection with valve on strainer blow down connection.

I. Provide pump suction fitting on suction side of base mounted centrifugal pumps. Remove temporary strainers after cleaning systems.

J. Support pump fittings with floor mounted pipe and flange supports.

K. Provide relief valves on pressure tanks, low-pressure side of reducing valves, heat exchangers, and expansion tanks.

L. Select system relief valve capacity greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.

M. Pipe relief valve outlet to nearest floor drain.

N. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

O. Feed glycol solution to system through make-up line with pressure regulator, venting system high points. Set to fill at 15 psig.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test for strength of glycol and water solution and submit written test results.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting installed construction.

B. Do not install hydronic pressure gauges until after systems are pressure tested.

END OF SECTION

SECTION 23 23 00
REFRIGERANT PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping.

B. Refrigerant.

C. Moisture and liquid indicators.

D. Valves.

E. Strainers.

F. Check valves.

G. Pressure relief valves.

H. Filter-driers.

I. Solenoid valves.

J. Expansion valves.

K. Receivers.

L. Flexible connections.

1.2 RELATED REQUIREMENTS

A. Section 08 31 00 - Access Doors and Panels.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 74 13 - Packaged Outdoor Central-Station Air-Handling Units.

1.3 REFERENCE STANDARDSMSS SP-69

A. AHRI 495 - Performance Rating of Refrigerant Liquid Receivers; 2005.

B. AHRI 710 - Performance Rating of Liquid-Line Driers; 2009.

C. AHRI 730 (I-P) - Flow Capacity Rating of Suction-Line Filters and Suction-Line Filter-Driers; 2013.

D. AHRI 750 - Thermostatic Refrigerant Expansion Valves; 2007.

E. AHRI 760 - Performance Rating of Solenoid Valves for Use With Volatile Refrigerants; 2007.

F. ASHRAE Std 15 - Safety Standard for Refrigeration Systems and Designation and Classification of Refrigerants ; 2019.

G. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2019.

H. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2019.

I. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.

J. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.

K. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.

L. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2016.

M. ASME B31.9 - Building Services Piping; 2017.

N. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.

O. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.

P. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2019.

Q. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).

R. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; 2012.

S. UL 429 - Electrically Operated Valves; Current Edition, Including All Revisions.

1.4 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

C. Filter-Driers:
   1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

D. Receivers:
   1. Use on systems 5 tons and larger, sized to accommodate pump down charge.
   2. Use on systems with long piping runs exceeding 100 feet.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.

C. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.

D. Design Data: Submit design data indicating pipe sizing. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Test Reports: Indicate results of leak test, acid test.

F. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.

G. Project Record Documents: Record exact locations of equipment and refrigeration accessories on record drawings.

H. Maintenance Data: Include instructions for changing cartridges, assembly views, spare parts lists.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for valves excluding packing.

1.11 MAINTENANCE MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two refrigerant oil test kits each containing everything required for conducting one test.

1.12 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two refrigerant filter-dryer cartridges of each type.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Filter-Driers:
1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

2.2 REGULATORY REQUIREMENTS

A. Comply with ASME B31.9 for installation of piping system.

B. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.

C. Welders Certification: In accordance with ASME BPVC-IX.

D. Products Requiring Electrical Connection: Listed and classified by UL, as suitable for the purpose indicated.

2.3 PIPING

A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.

B. Copper Tube to 7/8 inch OD: ASTM B88 (ASTM B88M), Type K (A), annealed.
   1. Fittings: ASME B16.26 cast copper.
   2. Joints: Flared.

C. Pipe Supports and Anchors:
   1. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.
   2. Vertical Support: Steel riser clamp.
   3. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   4. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.4 MOISTURE AND LIQUID INDICATORS

A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.5 VALVES

A. Diaphragm Packless Valves:
   1. UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, solder or flared ends, with positive backseating; for maximum working pressure of 500 psi and maximum temperature of 275 degrees F.

B. Service Valves:
   1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends, for maximum pressure of 500 psi.

2.6 STRAINERS

A. Straight Line or Angle Line Type:
   1. Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass; for maximum working pressure of 430 psi.

2.7 CHECK VALVES

A. Globe Type:

1. Cast bronze or forged brass body, forged brass cap with neoprene seal, brass guide and disc holder, phosphor-bronze or stainless steel spring, teflon seat disc; for maximum temperature of 300 degrees F and maximum working pressure of 500 psi.

B. Straight Through Type:
1. Brass body and disc, phosphor-bronze or stainless steel spring, neoprene seat; for maximum working pressure of 500 psi and maximum temperature of 250 degrees F.

2.8 PRESSURE RELIEF VALVES

A. Straight Through or Angle Type: Brass body and disc, neoprene seat, factory sealed and stamped with ASME UV and National Board Certification NB, selected to ASHRAE Std 15, with standard setting of 450 psi.

2.9 FILTER-DRIERS

A. Performance:
1. Design Working Pressure: 500 psi, minimum.

B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.

C. Construction: UL listed.
1. Connections: As specified for applicable pipe type.

2.10 SOLENOID VALVES

A. Valve: AHRI 760 I-P, pilot operated, copper, brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil failure), integral strainer, with flared, solder, or threaded ends; for maximum working pressure of 500 psi.

2.11 EXPANSION VALVES

A. Angle or Straight Through Type: AHRI 750; design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with non-replaceable capillary tube and remote sensing bulb and remote bulb well.

B. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F superheat. Select to avoid being undersized at full load and excessively oversized at part load.

2.12 ELECTRONIC EXPANSION VALVES

A. Valve:
1. Brass body with flared or soldered connection, needle valve with floating needle and machined seat, stepper motor drive.

B. Evaporation Control System:
1. Electronic microprocessor based unit in enclosed case, proportional integral control with adaptive superheat, maximum operating pressure function, preselection allowance for electrical defrost and hot gas bypass.

C. Refrigeration System Control: Electronic microprocessor based unit in enclosed case, with proportional integral control of valve, on/off thermostat, air temperature alarm (high and low), solenoid valve control, liquid injection adaptive superheat control, maximum operating pressure function, night setback thermostat, timer for defrost control.

2.13 RECEIVERS

A. Internal Diameter 6 inch and Smaller:
   1. AHRI 495, UL listed, steel, brazed; 400 psi maximum pressure rating, with tappings for inlet, outlet, and pressure relief valve.

B. Internal Diameter Over 6 inch:
   1. AHRI 495, welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; 400 psi with tappings for liquid inlet and outlet valves, pressure relief valve, and magnetic liquid level indicator.

2.14 FLEXIBLE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.5.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.

F. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

G. Provide clearance for installation of insulation and access to valves and fittings.

H. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 08 31 00.

I. Fully charge completed system with refrigerant after testing.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Test refrigeration system in accordance with ASME B31.5.

C. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test to no leakage.

3.4 SCHEDULES

A. Hanger Spacing for Copper Tubing.
   1. 1/2 inch, 5/8 inch, and 7/8 inch OD: Maximum span, 5 feet; minimum rod size, 1/4 inch.
   2. 1-1/8 inch OD: Maximum span, 6 feet; minimum rod size, 1/4 inch.
   3. 1-3/8 inch OD: Maximum span, 7 feet; minimum rod size, 3/8 inch.
   4. 1-5/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.
   5. 2-1/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.

END OF SECTION

SECTION 23 25 00
HVAC WATER TREATMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials.
   1. System cleaner.
   2. Closed system treatment (water).

1.2 RELATED REQUIREMENTS

A. Section 23 21 13 - Hydronic Piping.

B. Section 23 21 14 - Hydronic Specialties.

1.3 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

C. Shop Drawings: Indicate system schematic, equipment locations, and controls schematics, electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Indicate placement of equipment in systems, piping configuration, and connection requirements.

E. Manufacturer's Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

F. Certificate: Submit certificate of compliance from Authority Having Jurisdiction indicating approval of chemicals and their proposed disposal.

G. Project Record Documents: Record actual locations of equipment and piping, including sampling points and location of chemical injectors.

H. Operation and Maintenance Data: Include data on chemical feed pumps, agitators, and other equipment including spare parts lists, procedures, and treatment programs. Include step by step instructions on test procedures including target concentrations.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout products.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

1.9 MAINTENANCE SERVICE

A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance service.

B. Furnish regular technical service visits, for one years starting at Date of Substantial Completion, to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements and corrective actions needed. Submit two copies of field service report after each visit.

C. Furnish laboratory and technical assistance services during this maintenance period.

D. Furnish on site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

1.10 MAINTENANCE MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish chemicals for treatment and testing during warranty period.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Comply with applicable codes for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

B. Comply with UL (DIR) requirements.

C. Perform work in accordance with local health department regulations.

D. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation.

2.2 MATERIALS

A. System Cleaner:
   1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodiumtripoly phosphate and sodium molybdate.
   2. Biocide chlorine release agents such as sodium hypochlorite or calcium hypochlorite or microbiocides such as quarternary ammonia compounds, tributyltin oxide, methylene bis (thiocyanate).

B. Closed System Treatment (Water):
   1. Sequestering agent to reduce deposits and adjust pH; polyphosphate.

2. Corrosion inhibitors; boron-nitrite, sodium nitrite and borax, sodium totyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulphites.
3. Conductivity enhancers; phosphates or phosphonates.

PART 3 EXECUTION

3.1 PREPARATION

A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

B. Place terminal control valves in open position during cleaning.

C. Verify that electric power is available and of the correct characteristics.

3.2 CLEANING SEQUENCE

A. Concentration:
1. As recommended by manufacturer.
2. One pound per 100 gallons of water contained in the system.
3. One pound per 100 gallons of water for hot systems and one pound per 50 gallons of water for cold systems.

B. Hot Water Heating Systems:
1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
3. Circulate for 6 hours at design temperatures, then drain.
4. Refill with clean water and repeat until system cleaner is removed.

C. Use neutralizer agents on recommendation of system cleaner supplier and approval of Architect.

D. Flush open systems and glycol filled closed systems with clean water for one hour minimum. Drain completely and refill.

E. Remove, clean, and replace strainer screens.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 CLOSED SYSTEM TREATMENT

A. Use existing chemical pot feeder for treatment operations.

B. Introduce closed system treatment through bypass feeder when required or indicated by test.

3.5 MAINTENANCE

A. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the equipment manufacturer or original installer.

B. Provide service and maintenance of treatment systems for one year from Date of Substantial Completion.

C. Provide monthly technical service visits to perform field inspections and make water analysis on-site. Detail findings in writing on proper practices, chemical treating requirements, and corrective actions needed. Submit two copies of field service report after each visit.

D. Provide laboratory and technical assistance services during this maintenance period.

E. Provide on-site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flexible ducts.

B. Ducts for kitchen exhaust applications.

C. Metal ductwork.

D. Nonmetal ductwork.

E. Duct cleaning.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 23 07 13 - Duct Insulation: External insulation and duct liner.

C. Section 23 33 00 - Air Duct Accessories.

1.3 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASHRAE Std 126 - Method of Testing HVAC Air Ducts; 2016.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

H. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.

I. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.

J. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.

K. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.

L. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

M. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2018.

N. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.

O. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

P. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.

Q. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.

R. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

S. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.

T. UL 2221 - Tests of Fire Resistive Grease Duct Enclosure Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for duct materials.

C. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for all modifications / systems. Contractor will be responsible for any rework of shop drawings due to field conditions prior to approval of drawings. Contractor shall field verify field conditions prior to submitting shop drawings.

D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).

E. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 CLOSEOUT SUBMITTALS

A. See Section 01 70 00 - Execution and Closeout Requirements for closeout procedures.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of documented experience.

C. Maintain one copy of each document on site.

1.7 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

C. Provide offsets as required for installation of ductwork due to field conditions.

1.8 FIELD MEASUREMENTS

A. Verify field measurements of all duct installations prior to fabrication.

1.9 WARRANTY

A. See Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 PRODUCTS

2.1 DUCT ASSEMBLIES

A. Regulatory Requirements: Construct ductwork to comply with 1 standards.

B. Ducts: Galvanized steel, unless otherwise indicated.

C. Supply (Heating Systems): 4 inch wg pressure class, galvanized steel or galvannealed steel (painted).

D. Supply (System with Cooling Coils): 4 inch wg pressure class, galvanized steel or galvannealed steel (painted).

E. Return and Relief: 4 inch wg pressure class, galvanized steel or galvannealed steel (painted).

F. General Exhaust: 4 inch wg pressure class, galvanized steel or galvannealed steel (painted).

G. Dishwasher Exhaust: 4 inch w.g. pressure class, aluminum.
   1. Construction:
      a. Liquidtight with continuous external weld for all seams and joints.
      b. Where ducts are not self draining back to equipment, provide low point drain pocket with copper drain pipe to sanitary sewer.

H. Grease Exhaust: 4 inch wg pressure class, stainless steel.
   1. Construction:
      a. Liquidtight with continuous external weld for all seams and joints.
      b. Where ducts are not self draining back to equipment, provide low point drain pocket with copper drain pipe to sanitary sewer.
   2. Access Doors:
      a. Provide for duct cleaning inside horizontal duct at drain pockets, every 20 feet and at each change of direction.
      b. Use same material and thickness as duct with gaskets and sealants rated 1500 degrees F for grease tight construction.

I. Fume Hood Exhaust: 4 inch wg pressure class, galvanized steel.

J. Outside Air Intake: 4 inch wg pressure class, galvanized steel or galvannealed steel (painted).

K. Transfer Air and Sound Boots: 1/2 inch wg pressure class, galvanized steel or galvannealed steel (painted).

L. Dust Collector Exhaust: 10 inch wg pressure class, galvanized steel or galvannealed steel (painted).

2.2 MATERIALS

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.

B. Aluminum for Ducts: ASTM B209/B209M; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T651 or of equivalent strength.

C. Stainless Steel for Ducts: ASTM A666, Type 304.

D. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
2. VOC Content: Not more than 250 g/L, excluding water.
3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
4. For Use with Flexible Ducts: UL labeled.

E. Gasket Tape: Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle rings connections.

F. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

G. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

2.3 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.

B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.

C. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

D. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

E. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.

F. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

G. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

H. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide duct transition to louver frame size.

2.4 MANUFACTURED DUCTWORK AND FITTINGS

A. Material Requirements:
   1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
   2. Aluminum: ASTM B209/B209M, aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T651 or of equivalent strength.

B. Rectangular Metal Duct:
   1. Rectangular Double Wall Insulated: Rectangular spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
      a. Insulation:
         1) Thickness: 1 inch.
         2) Material: Air.

C. Flat-Oval Metal Ducts:
   1. Flat-Oval Single Wall Duct: Machine made from a round spiral lock seam duct.
      a. Fittings: Manufacture at least two gauges heavier metal than the duct.
      b. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
   2. Flat-Oval Double Wall Insulated Duct: Machine made from round spiral lock seam duct.
      a. Fittings: Manufacture with solid inner wall.
      b. Inner Wall: Perforated galvanized steel.
      c. Insulation:
         1) Thickness: 1 inch fiberglass.

D. Round Spiral Duct:
   1. Round spiral lock seam duct with galvanized steel outer wall.

E. Connectors, Fittings, Sealants, and Miscellaneous:
   1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
   2. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
      a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
      b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
   3. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows:

F. Spiral Ducts: Round spiral lockseam duct with galvanized steel outer wall.
   1. Manufacture in accordance with SMACNA (DCS).

G. Flexible Ducts: UL 181, Class 1, UV-inhibited black polymer film supported by helically wound spring steel wire.
   1. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
   2. Pressure Rating: 10 inches wg positive and 0.5 inches wg negative.
   3. Maximum Velocity: 4000 fpm.
   4. Temperature Range: Minus 20 degrees F to 175 degrees F.

2.5 FLEXIBLE DUCTS

A. Flexible Air Ducts:
   1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.
   2. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
   3. Pressure Rating: From 10 in-wc to 1 in-wc negative.
   4. Temperature Range: Minus 20 to 210 degrees F.

2.6 DUCTS FOR KITCHEN EXHAUST APPLICATIONS

A. Provide ductwork, fittings, and appurtenances per NFPA 96, SMACNA (KVS), UL 1978, and UL 2221 requirements and guidelines.

B. Class 1 duct for air with gas and grease particle exhaust at an air velocity of 1,500 to 2,500 fpm.

C. Where ducts are not self-draining back to equipment, provide low-point drain pocket with the copper drain pipe to a sanitary sewer.

D. Design, fabricate, and install liquidtight preventing exhaust leakage into building.

E. Kitchen Hood and Grease Exhaust Duct:
   1. Fabricate in accordance with ductwork manufacturer's instructions, SMACNA (DCS), SMACNA (KVS), and NFPA 96.
   2. Rectangular, Single-Wall, Premanufactured Grease Exhaust Duct:
      a. UL Listed and labeled to UL 1978.
      b. Construct of 16 gauge, 0.059-inch sheet steel using continuous external welded joints in rectangular sections.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Install in accordance with manufacturer's instructions.

C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

E. Kitchen Range Hoods: Install when provided by Section 11 40 00 then fit-out with respective ductwork and accessories to interconnect exhaust system.

F. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

G. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.

H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

I. Use double nuts and lock washers on threaded rod supports.

J. Connect terminal units to supply ducts directly or with one foot maximum length of flexible duct. Do not use flexible duct to change direction.

K. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

L. Set plenum doors 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.

M. At exterior wall louvers, seal duct to louver frame and transition to louver frame size.

3.2 CLEANING

A. Clean duct systems with high power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air turning devices/extractors.

B. Backdraft dampers - metal.

C. Combination fire and smoke dampers.

D. Duct access doors.

E. Duct test holes.

F. Fire dampers.

G. Flexible duct connectors.

H. Smoke dampers.

I. Volume control dampers.

1.2 RELATED REQUIREMENTS

A. Section 23 31 00 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

A. ICC (IMC)-2015 - International Mechanical Code; 2015.

B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

C. NFPA 92 - Standard for Smoke Control Systems; 2018.

D. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.

E. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

F. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.

G. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.

H. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors, and duct test holes.

D. Manufacturer's Installation Instructions: Provide instructions for fire dampers and combination fire and smoke dampers.

E. Project Record Drawings: Record actual locations of access doors and test holes.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Fusible Links: One of each type and size.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit for Fire Dampers.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Dampers tested, rated and labeled in accordance with the latest UL requirements.

C. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

D. Maintain one copy of each document on site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

C. Storage: Store materials in a dry area indoor, protected from damage.

D. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work where appropriate with building control Work.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 BACKDRAFT DAMPERS - METAL

A. Manufacturers:
1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
2. Nailor Industries, Inc: www.nailor.com/#sle.

B. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

C. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers:
1. Nailor Industries, Inc: www.nailor.com/#sle.
2. PCI Industries, Inc; Pottorff Brand : www.portorff.com.
3. Ruskin Company, a brand of Johnson Controls: www.ruskin.com/#sle.

B. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.

C. Electro Thermal Link: Fusible link melting at 165 degrees F; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.4 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Access doors with sheet metal screw fasteners are not acceptable.

2.5 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.6 FIRE DAMPERS

A. Manufacturers:
1. Nailor Industries, Inc: www.nailor.com/#sle.
2. PCI Industries, Inc; Pottorff Brand : www.portorff.com.
3. Ruskin Company, a brand of Johnson Controls: www.ruskin.com/#sle.

B. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream except for 1.0 inch pressure class ducts up to 12 inches in height.

C. Fusible Links: UL 33, separate at 160 degrees F with adjustable link straps for combination fire/balancing dampers.

2.7 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

2.8 SMOKE DAMPERS

A. Manufacturers:

B. Fabricate in accordance with NFPA 90A and UL 555S, and as indicated.

C. Dampers: UL Class 1 airfoil blade type smoke damper, normally open automatically operated by pneumatic actuator.

D. Electro Thermal Link: Fusible link melting at 165 degrees F; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.9 VOLUME CONTROL DAMPERS

A. Single Blade Dampers:
   1. Fabricate for duct sizes up to 6 by 30 inch.
   2. Blade: 24 gauge, 0.0239 inch, minimum.

B. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
   1. Blade: 18 gauge, 0.0478 inch, minimum.

C. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 31 00 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 by 8 inch size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch for balancing dampers only. Review locations prior to fabrication.

D. Provide duct test holes where indicated and required for testing and balancing purposes.

E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by

Authorities Having Jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.

G. Demonstrate re-setting of fire dampers to Owner's representative.

H. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

I. For fans developing static pressures of 5.0 inches and over, cover flexible connections with leaded vinyl sheet, held in place with metal straps.

J. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

K. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 34 23
HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Kitchen hood upblast roof exhausters.

1.2 RELATED REQUIREMENTS

A. Section 23 31 00 - HVAC Ducts and Casings.

B. Section 23 33 00 - Air Duct Accessories: Backdraft dampers.

1.3 REFERENCE STANDARDS

A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.

B. AMCA 99 - Standards Handbook; 2016.

C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005 (Reaffirmed 2012).

D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.

E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.

C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 FIELD CONDITIONS

A. Request Owner permission to use permanent ventilator(s) for ventilation during construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Loren Cook Company: www.lorencook.com/#sle.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 POWER VENTILATORS - GENERAL

A. Static and Dynamically Balanced: Comply with AMCA 204.

B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.

C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.

D. Fabrication: Comply with AMCA 99.

E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.3 KITCHEN HOOD UPBLAST ROOF EXHAUSTERS

A. Direct Drive Fan:
   1. Fan Wheel:
      a. Type: Non-overloading, backward inclined centrifugal.
      b. Material: Aluminum, statically and dynamically balanced.
   2. Housing:
      a. Construct of heavy gauge aluminum including curb cap, windband, and motor compartment.
      b. Rigid internal support structure.
      c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.
      d. Construct drive frame assembly of heavy gauge steel, mounted on vibration isolators.
      e. Provide breather tube for fresh air motor cooling and wiring.

B. Shafts and Bearings:
   1. Fan Shaft:
      a. Ground and polished steel with anti-corrosive coating.
      b. First critical speed at least 25 percent over maximum cataloged operating speed.
   2. Bearings:
      a. Permanently sealed or pillow block type.
      b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
      c. 100 percent factory tested.

C. Drive Assembly:
   1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
   2. Belts: Static free and oil resistant.
   3. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
   4. Motor pulley adjustable for final system balancing.
   5. Readily accessible for maintenance.

D. Disconnect Switches:
   1. Factory mounted and wired.
   2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
   3. Finish for Painted Steel Enclosures: Provide manufacturer's standard or factory-applied gray unless otherwise indicated.
   4. Positive electrical shutoff.
   5. Wired from fan motor to junction box installed within motor compartment.

E. Roof Curb: 16 inch high self-flashing of galvanized steel with continuously welded seams, wind rated, built-in cant strips, insulation and curb bottom, ventilated double wall, and factory installed nailer strip.

F. Drain Trough: Allows for single-point drainage of water, grease, and other residues.

G. Options/Accessories:
   1. Birdscreen:
      a. Provide galvanized steel construction.
   2. Clean Out Port: Removable grease repellent compression rubber plug allows access for cleaning wheel through windband.

H. Performance Ratings: As indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.

C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

D. Provide sheaves required for final air balance.

E. Install backdraft dampers on inlet to roof and wall exhausters.

END OF SECTION

SECTION 23 35 13
DUST COLLECTION SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Industrial centrifugal exhaust fans.

B. Ductwork and duct fittings.

C. Inlet fittings.

D. Dust Collector

E. Centrifugal separator.

F. Accessories.

1.2 REFERENCE STANDARDS

A. ACGIH (IV) - Industrial Ventilation, A Manual of Recommended Practice (30th Edition); 2019.

B. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.

C. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.

D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

F. NFPA 91 - Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids; 2015.

G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

H. SMACNA (RIDC) - Rectangular Industrial Duct Construction Standards; 2007.

I. SMACNA (ROUND) - Round Industrial Duct Construction Standards; 2013.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturers literature and data indicating rated capacities, dimensions, weights and point loadings, accessories, electrical characteristics and connection requirements, wiring diagrams, and location and sizes of field connections.

C. Provide fan curves with specified operating point clearly plotted.

D. Operation and Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 INDUSTRIAL CENTRIFUGAL EXHAUST FANS

A. Wheel and Inlet:
   1. Backward Inclined: Steel construction with smooth curved inlet flange, heavy back plate, backwardly curved blades welded or riveted to flange and back plate; cast iron hub riveted to back plate and keyed to shaft with set screws.

B. Housing: Heavy gauge steel, spot welded with inlet bell and shaped cut-off, factory finished with enamel or prime coat. Provide bolted construction with horizontal flanged split housing.

C. Motors and Drives:
   1. Bearings: Heavy duty pillow block type, self aligning, grease-lubricated ball bearings or roller bearings.
   2. Shafts: Hot rolled steel, ground and polished, with key-way, protectively coated with lubricating oil.
   3. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed; variable and adjustable pitch for motors 15 hp and under; fixed sheaves for motors 20 hp and over, matched belts, and rated minimum 1.5 times nameplate rating of motor.
   4. Belt Guard: Fabricate to SMACNA (DCS); stainless steel, 12 gauge, 0.1094 inch minimum thickness, with 3/4 inch diamond mesh wire screen welded to steel angle frame or approved equivalent, prime coated.

2.2 DUCTWORK AND DUCT ACCESSORIES

A. Flexible Connectors: UL listed, fire-retardant chloroprene or chlorosulfonated polyethylene impregnated fabric, minimum density 20 oz per sq yd, approximately 2 inches wide, crimped into metal edging strip.

B. Angle rings: Carbon Steel, unpainted, leg out, drilled with bolt holes.

C. Blast Gates: Half collar of cast aluminum, with galvanized steel slide, set screw.

D. Flat Back Elbows: Long radius rectangular elbow at duct material with heavy gauge, removable, stainless steel back strip.

E. Ball Joints: Cast iron with tubular studs for connecting ducts, allowing 25 degree angle off center.

2.3 INLET FITTINGS

A. Fabricate from 16 gauge, 0.0598 inch galvanized steel, minimum base sheet thickness.

2.4 DUST COLLECTOR

A. Manufacturer:
   1. Sternvent

B. General:
   1. Furnish and install, where shown on the plans, a high efficiency filter type dust collector with integral blower sized for design air flow as shown on the schedule.
   2. Dust collector shall be self-cleaning fabric type complete with cotton filters, backward inclined blower, motorized shaker, factory wired controller and external discharge silencer. Manufacturer’s literature shall state that dust collector and selected filter spacing is designed for the collection of wood dust. Dust collector shall be airtight, all steel

construction with sealed seams and gasketed quick opening doors with 1/4 turn knobs. Housing shall be a minimum of 14-ga. mild steel. Unit shall consist of a filter section, with sloped roof to shed rain and a funnel bottom section without slide gates or doors to allow downflow of dust directly into 2 55-gallon drum assemblies furnished by manufacturer. Inlet, with baffle, shall be centered on rear for models DKPD 540 for even distribution of dust to the drums. Designs with inlet on narrow side shall not be accepted. Include an explosion relief vent, in the dirty section of the filter housing, per NFPA #664.

3. Unit to include a multi-pocket filter modules, which is sewn from 8-ounce cotton sateen fabric designed to deliver in excess of 99.5% efficiency by weight on industrial dusts. The filters shall have closed bottom and open top pockets, for the wood waste to remain on the outside surfaces of the filter media. Inside of each pocket shall be a rigid insert separator to prevent collapse of filters and loss of the effective filter area. Flat shaker fingers located at the bottom of the filter module shall prevent adjoining pockets from touching one another and blanking off. The filter pocket spacing shall be wide spacing to permit the collected dust to be shaken off the exterior of the filters and recommended by the manufacturer for the collection of wood dust. Total airflow to filter fabric area (air to cloth ratio) shall not exceed 10 CFM per square foot. Filter designs with open bottoms that allow the wood waste to enter the inside of the filters will not be accepted, because of the potential for wood waste to bridge and not shake down. Each filter module shall be secured in place by two lever, operated over-center, locking mechanisms to assure a positive seal and allow for easy removal of filters from outside of unit. Designs which require entry into unit (confined space) or require hand tools to remove the filters, for filter maintenance, are not acceptable.
4. Filters will be cleaned automatically after a fifteen second delay following the shutdown of the blower, by the oscillating action delivered by the motorized eccentric driven shaker assembly, which imparts a rapid and strong vibratory force throughout the entire surface of each individual filter pocket to dislodge the dust. Filters that are suspended from bungee cords or rubber bands are not acceptable. Shaker motor shall be 1/2 HP for sizes 540. Operation of the automatic shaker shall be controlled by a solid state, dual mode timer with adjustable shaker cycle range from 1.8 - 180 seconds. Magnetic starters with overload relays for the blower and shaker motor and control transformer shall be factory wired in a NEMA 4 control panel mounted on the unit for single point wiring. Outdoor NEMA 3R safety disconnect switches factory mounting & wiring. Also included shall be a push button station for remote mounting.
5. The control panel wiring shall be either UL or ETL labeled for compliance with 508A. Control panels not labeled by dust collector manufacturer shall be labeled, in field, by a certified UL or ETL representative, prior to placing equipment in operation.
6. The integral non-sparking AMCA Type C direct drive blower shall be located on the clean air side of the filters, top mounted at the factory and be of the backward inclined design with a dynamically balanced impeller. It shall be driven by a 15 HP [or shown on schedule] 3450 RPM, TEFC motor. The blower shall be tested in accordance with AMCA Standard 210. A factory-supplied cover shall protect the motor cooling fan from ice.
7. Discharge noise from the blower shall be attenuated by an external field supported duct silencer fabricated with 4.75 lb. density inorganic mineral or glass fiber. This media shall be protected from erosion by the air flow through the use of galvanized perforated metal with aerodynamic leading and trailing edges to insure maximum acoustical insertion loss at minimum static pressure drop. Lining of the fan scroll, instead of an external silencer, shall not be accepted.
8. Interior and exterior carbon steel surfaces shall be coated with two part epoxy primer and exterior painted with Sternvent gray two part urethane enamel.
9. Unit shall be Sternvent Vibraclean Model DKPD-540[as shown on the schedule] allowed.]

2.5 CENTRIFUGAL SEPARATOR

A. Cyclone dust collector consisting of cyclone with integral fan and structural stand incorporating dust storage.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

3.2 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Install in accordance with NFPA 91, SMACNA (DCS), SMACNA (ROUND), SMACNA (RIDC), and ACGIH (IV) except as indicated.

C. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. Provide flexible duct rated for wood dust collection and make final connections to equipment.

F. Equipment connections to be provided with a slide gate capable of being pinned in position after completion of air system balance. Slide gates on floor sweeps shall not be pinned in place and shall be shut at time of balance.

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Diffusers

B. Rectangular ceiling diffusers.

C. Registers/grilles:
   1. Ceiling-mounted, exhaust and return register/grilles.
   2. Ceiling-mounted, supply register/grilles.
   3. Wall-mounted, exhaust and return register/grilles.

D. Louvers:
   1. Combination louvers.

E. Roof hoods.

1.2 RELATED REQUIREMENTS

A. Section 09 91 23 - Interior Painting: Painting of ducts visible behind outlets and inlets.

1.3 REFERENCE STANDARDS

A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.

B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).

C. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

C. Project Record Documents: Record actual locations of air outlets and inlets.

D. Test Reports: Rating of air outlet and inlet performance.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

B. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Price Industries: www.price-hvac.com/#sle.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 RECTANGULAR CEILING DIFFUSERS

A. Type: Provide square, stamped, multi-core, square, adjustable pattern, stamped, multi-core, square and rectangular, multi-louvered, square and rectangular, adjustable pattern, and multi-louvered diffuser to discharge air in 360 degree, one way, two way, three way, and four way pattern with sectorizing baffles where indicated.

B. Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.

C. Fabrication: Steel with baked enamel finish.

D. Color: As selected by Architect from manufacturer's standard range.

E. Accessories: Provide radial opposed blade, butterfly, and combination splitter volume control damper; removable core, sectorizing baffle, safety chain, wire guard, equalizing grid, operating rod extension, anti-smudging device, and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

2.3 CEILING SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, double deflection.

B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.

C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory off-white enamel finish.

D. Color: As selected by Architect from manufacturer's standard range.

E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

F. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.

2.4 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.

B. Frame: 1 inch margin with Channel lay-in frame for suspended grid ceilings.

C. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Color: To be selected by Architect from manufacturer's standard range.

E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

F. Gymnasiums: Provide front pivoted or welded in place blades, securely fastened to be immobile.

2.5 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.

B. Frame: 1-1/4 inch margin with countersunk screw mounting.

C. Fabrication: Steel frames and blades, with factory baked enamel finish.

D. Color: To be selected by Architect from manufacturer's standard range.

2.6 LOUVERS

A. Type: 4 inch deep frame with blades on 45 degree slope with center baffle and return bend, heavy channel frame, 1/2 inch square mesh screen over intake or exhaust end.

B. Mounting: Furnish with interior flat flange for installation.

2.7 ROOF HOODS

A. Fabricate louver penthouses with mitered corners and reinforce with structural angles.

B. Mount unit on minimum 12 inch high, wind rated curb base with insulation between duct and curb.

C. Make hood outlet area minimum of twice throat area. Sizes given on plan are throat size.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.

C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

D. Install diffusers to ductwork with air tight connection.

E. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

F. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 91 23.

END OF SECTION

SECTION 23 52 17
STAINLESS STEEL CONDENSING BOILER

PART 1 GENERAL:

1.1 SECTION INCLUDES

A. Packaged, factory-fabricated and -assembled, domestic water heat exchanger

1.2 SUBMITTALS

A. Product Data: Include performance data, operating characteristics, furnished specialties and accessories.
   1. Prior to flue vent installation, engineered calculations and drawings must be submitted to Architect/Engineer to thoroughly demonstrate that size and configuration conform to recommended size, length and footprint for each submitted boiler.

B. Pressure Drop Curve: Submit pressure drop curve for flows ranging from 0 GPM to maximum value of heat exhanger
   1. If submitted material is different from that of the design basis, manufacture shall incur all costs associated with reselection of necessary pumps. Possible differences include, but are not limited to, the pump type, pump pad size, electrical characteristics and piping changes.

C. Shop Drawings: For boilers, boiler trim and accessories, include:
   1. Plans, elevations, sections, details and attachments to other work
   2. Wiring Diagrams for power, signal and control wiring

D. Source Quality Control Test Reports: Reports shall be included in submittals.

E. Field Quality Control Test Reports: Reports shall be included in submittals.

F. Operation and Maintenance Data: Data to be included in boiler emergency, operation and maintenance manuals.

G. Warranty: Standard warranty specified in this Section

H. Other Informational Submittals:
   1. ASME Stamp Certification and Report: Submit "A," "S," or "PP" stamp certificate of authorization, as required by authorities having jurisdiction, and document hydrostatic testing of piping external to boiler.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices and Accessories: Boilers must be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. I=B=R Performance Compliance: Condensing boilers must be rated in accordance with applicable federal testing methods and verified by AHRI as capable of achieving the energy efficiency and performance ratings as tested within prescribed tolerances.

C. ASME Compliance: Condensing boilers must be constructed in accordance with ASME Boiler and Pressure Vessel Code, Section IV “Heating Boilers”.

D. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."

E. DOE Compliance: Minimum efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."

F. UL Compliance: Boilers must be tested for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

G. NOx Emission Standards: When installed and operated in accordance with manufacturer's instructions, condensing boilers shall comply with the NOx emission standards outlined in South Coast Air Quality Management District (SCAQMD), Rule 1146.2; and the Texas Commission on Environmental Quality (TCEQ), Title 30, Chapter 117, Rule 117.465.

1.4 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement and formwork requirements are specified in Division 03.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide AERCO International, or a comparable product by one of the following:
   1. AERCO International
   2. Buderus
   3. Viessmann Manufacturing Co. (US) Inc.

2.2 CONSTRUCTION

A. Each heater shall be of the counter-current flow stainless steel, plate and frame heat exchanger designed and manufactured in accordance with ASME Code Section VIII, Div. 1 for 150 psig @ 257 ºF or 200 psig @ 257 ºF. The heat exchanger shall be atmospherically vented with visible leak detection ports. The packaged heater shall be rated for not less than 150 psig on the service water side and not less than 150 PSIG, 250°F on the boiler water side. The plates shall be AISI 316 stainless steel, and the gaskets shall be EPDM material.

2.3 CONTROLS

A. The heater shall maintain +/- 2°F Max temperature fluctuation from temperature setpoint at 0% to 100 % load at a constant load and +/- 4°F under normal diversified domestic load conditions. The system shall consist of a 3-way electronic control valve, constant speed domestic water circulator pump, control panel enclosure housing a PID temperature controller with digital indication of shell outlet water temperature, boiler water inlet and boiler water outlet temperatures, digital over-temperature limit switch, and feed-forward and feedback temperature sensors. The controller shall close the control valve in an over-temperature condition. The system shall have the following additional characteristics:

B. · Controller temperature setpoint range between 50°F to 180°F maximum

C. · Configured for 120V/1Phase/60 Hz and 220V/1Phase/50 Hz

D. · Easy start-up. Dial in setpoint & walk away.

E. The electronic control valve shall be of equal percentage flow characteristics, and has a tight shut-off with low leakage rate of .02% of its Cv value. The valve shall have the following performance characteristics:

F. · 1000 to 1 Turndown.

G. · Magnetic Actuator with Fail Closed Design-particularly on loss of power

H. · Time to Full Open Position: 2 seconds

I. · Time to Full Closed Position: 2 seconds

J. The PID temperature controller shall incorporate a feed-forward function and be password protected. The controller shall be capable of remote communications via an optional add-in board & utilizes the MODBUS protocol for interoperability with Building Automation Systems (BAS).

K. Controls interface with BACnet, Lonworks, and N2 shall utilize an optional AERCO Communications Gateway to act as a MODBUS interface/translator between the BAS and the MODBUS port of the temperature controller. The AERCO Communications Gateway shall be comprised of a microprocessor based control utilizing the MODBUS protocol to communicate with the temperature controller. Non-volatile backup of all point mappings and programs shall be internally provided as standard. Connection between Gateway and individual water heaters shall be “daisy chain” with shielded, twisted pair, low voltage wiring for ease of installation.

L. The following information shall be accessible locally at the controller or remotely via the communications port:

M. · Setpoint – can be changed remotely

N. · Outlet Temperature

O. · Over Temperature Alarm

P. · Control Output Signal to valve

Q. Each heater shall be supplied by the manufacturer ready to accept existing boiler water and domestic water lines, and furnished with the following accessories:

R. a. Y-strainers with blowdown valve for boiler water and domestic water.

S. b. Boiler water strainer differential pressure gauge.

T. c. Bronze T & P relief valve, conforming to ANZI Z21.22, set at 150 PSIG/210°F or Pressure Relief Valve set at 200 PSIG

U. d. Bronze ball type isolation valves.

V. e. 3/4" Bronze domestic water drain valve.

W. f. Domestic water Air Vent rated for either 150 PSIG operation or 200 PSIG operation accordingly.

X. g. In-place connections for easy and simple cleaning of the plate and frame heat exchanger.

2.4 WARRANTY

A. The Heat Exchanger shall carry a 5-year warranty and all other parts/components shall carry an 18-month warranty against mechanical failure or workmanship from the date of shipment.

PART 3 EXECUTION

3.1 EXAMINATION

A. Before installation examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations and piping and electrical connections to verify actual locations, sizes and other conditions affecting boiler performance, maintenance and operations.
   1. Final locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

B. Examine mechanical spaces for suitable conditions where boilers will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 sections. Drawings indicate general arrangement of piping, fittings and specialties.

B. Install piping to permit service and maintenance.

C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.

D. Connect hot-water piping to supply and return tappings with shutoff valve and union or flange at each connection.

E. Install piping from safety relief valves to nearest floor drain.

END OF SECTION

SECTION 23 63 13
AIR COOLED REFRIGERANT CONDENSERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured units.

B. Casing.

C. Condenser coils.

D. Fan requirements.

E. Controls.

1.2 RELATED REQUIREMENTS

A. Section 23 23 00 - Refrigerant Piping.

1.3 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.

B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems and Designation and Classification of Refrigerants ; 2019.

C. ASHRAE Std 20 - Methods of Testing for Rating Remote Mechanical-Draft Air-Cooled Refrigerant Condensers; 2019.

D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.

F. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide rated capacities, weights, accessories, electrical requirements, and wiring diagrams.

C. Shop Drawings: Indicate components, assembly, dimensions, weights and loading, required clearances, and location and size of field connections. Include schematic layouts showing condenser, refrigeration compressors, cooling coils, refrigerant piping and accessories required for complete system.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Provide packaged, factory assembled, pre-wired unit, suitable for outdoor use consisting of casing, condensing coil and fans, integral sub-cooling coil liquid accumulator.

B. Construction and Ratings: In accordance with AHRI 210/240 and UL 207. Testing shall be in accordance with ASHRAE Std 20.

C. Performance Ratings: Energy Efficient Rating (EER)/Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1 I-P, in combination with compressor units.

2.2 CASING

A. House components in welded steel frame with steel panels with weather resistant, baked enamel finish.

B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.

C. Provide removable access doors or panels with quick fasteners.

2.3 CONDENSER COILS

A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.

2.4 FAN REQUIREMENTS

A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge, equipped with roller or ball bearings with grease fittings extended to outside of casing.

B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built-in current and thermal overload protection.

2.5 CONTROLS

A. Provide factory wired and mounted control panel, NEMA 250, containing fan motor starters, fan cycling thermostats, compressor interlock, and control transformer.

B. Provide controls to permit operation down to -5 degrees F ambient temperature.

C. Provide thermostat to cycle fan motors in response to outdoor ambient temperature.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide connection to refrigeration piping system. See Section 23 23 00. Comply with ASHRAE Std 15.

C. Provide cooling season start-up, winter season shut-down service, for first year of operation.

D. Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

END OF SECTION

SECTION 23 72 00
AIR-TO-AIR ENERGY RECOVERY EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Energy recovery ventilators.

B. Heat recovery heat exchangers.

1.2 RELATED REQUIREMENTS

A. Section 07 72 00 - Roof Accessories: Equipment roof curb.

B. Section 23 09 23 - Direct-Digital Control System for HVAC.

1.3 REFERENCE STANDARDS

A. AHRI 1060 (I-P) - Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment; 2014.

B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017.

C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks; 2016, with Errata (2018).

E. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2014.

F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

I. UL (DIR) - Online Certifications Directory; Current Edition.

J. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's installation instructions, product data, and engineering calculations.

C. Manufacturer's qualification statement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store equipment and products to be installed indoors in dry heated area.

1.7 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 ENERGY RECOVERY VENTILATOR

A. Manufacturers:
1. RenewAire; IJ-ERV-1: www.renewaire.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. ERV Equipment Construction Requirements:
1. Energy Recovery Exchanger Type: Energy wheel.
2. Supply and Return Duct Connection Orientation: As indicated on drawings.
3. Casing and Frame:
a. Frame: Galvanized steel body or welded extruded aluminum tubular frame capable of supporting components and casings including integral base lifting holes.
b. Double Wall Panels: Minimum of 18 gauge, 0.040 inch galvanized steel.
c. Doors: Construct doors of same construction and thickness as wall panels. Include p-shaped extruded neoprene gasket, prop rod, chain with spring, exterior handle, and interior 3-point latching device. Label each door to identify equipment located within.
d. Insulation Requirements:
1) Mold Resistance: "Pass" when tested in accordance with ASTM C1338.
2) Fungal Resistance: No growth when tested in accordance with ASTM G21.
3) Bacteria Resistance: No growth when tested in accordance with UL 181.
4) Flame spread index of 25 or less and maximum smoke developed index of 50.
e. Isolation and Sealing: Form continuous, thermally isolated, weathertight seal between inner wall of panels and structural framing with closed cell PVC foam gasketing and seal seams to prevent job site caulking.
f. Access Panels: Provide access to components through a large, tightly sealed and easily removable hinged or screwed access panel.
g. Finish: Polyurethane enamel over weather-protected, corrosion-resistant assembly.
h. Nameplate: Permanent name plate listing manufacturer, model number, serial number, voltage with tolerance, and amp ratings mounted inside door near electrical panel.

4. Supply and Exhaust Fans:
   a. Provide separate non-overloading, statically and dynamically balanced, draw-through, forward curved centrifugal fan or fan-array for each air stream.
   b. Fan Motor: Constant Speed, high efficiency, load matched, belt-driven, open drip proof, thermal overload protected TEFC motor with variable-sheave belt drive, and adjustable-removable motor-slide base. Size drives to 150 percent of load, minimum.
   c. Belt Guards: Full sized, hinged, painted with high-visibility safety color, and accessible with standard tools.
   d. Motor Bearings: Permanently lubricated sealed ball bearings rated for not less than 200,000 hours of operation with accessible greased fittings.
5. Dampers and Louvers:
   a. Service Ratings: Up to 6 in-wc closed and 3,000 fpm when open.
   b. Frame: Minimum of 20 gauge, 0.0359 inch galvanized steel channel with rear flange, prepunched mounting holes, and welded corner clips for maximum rigidity.
   c. Exhaust Damper: Parallel blade, barometric damper for exhaust air stream isolation.
   d. Outdoor-Intake Louver: Parallel blade, for exhaust air stream isolation. Provide weatherhood with intake insect screen and mist eliminator.
6. Electric Heating Section:
   a. UL (DIR), exposed helical coil of nickel-chrome resistance wire with refractory ceramic support bushings with casing, hinged cover, and controls terminal box. Size for full load capacity.
   b. Controls: Fused disconnect switch, high-limit thermal cut-out switch, modulated SCR, airflow proving switch, and light-indicating hand switch for device reset. Provide step-down fused transformer for voltages lower than main source.
7. Filter Sections:
   a. Outdoor-Intake and Exhaust Sides: 2 inch thick, pleated, MERV 13 filters, ASHRAE Std 52.2.
   b. Filter Racks: Bolt-on rack constructed of aluminum with minimum size of 1/12 inch thick. Include hinged side access door and snap fasteners.
8. Roof Curbs:
   a. Curbs: Provide full perimeter, watertight, sloped, weight-supporting roof curb fabricated from minimum of 10 gauge, 0.1345 inch aluminized steel.
   b. Isolation Rails: Provide factory-installed, 12 gauge, 0.1046 inch aluminized steel angles top and bottom, connected with flexible, outdoor rated membrane and factory-installed vibration isolation springs.
   c. Gaskets: Provide closed cell PVC foam, field installed top of curb.
9. Electrical:
   a. 480 VAC, 3-phase with single-point power connection to nonfused main disconnect interlocked with control panel and other components.
   b. Install internal wiring in accordance with NFPA 70 within flexible, liquid tight steel conduit.
10. Controls and Local Control Panel:
    a. Unit Controls: Factory supplied DDC with sensors, limit switches, and frost control.
    b. Provide fused disconnect within local control panel with power supplies, transformers, terminal strip or terminal blocks for interface of field installed components.
    c. Service Status: Provide both local and remote indication of sensor readings and status of safeties and other status items including power on, wheel-rotation alarm, outside-air loaded filter and exhaust-air loaded filter.
    d. Provide temperature, humidity, dewpoint temperature, CO2, and wheel rotation sensors.
    e. Freeze Protection Thermostat: Provide and configure to stop unit when outdoor air intake temperature drops below 38 degrees F, adjustable.
11. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135, BACnet MS/TP.
12. Configuration: Adjust listed requirements in conformance with ASHRAE Std 90.1 I-P.

13. Certification: AHRI 1060 (I-P) labeled, include copy of published ratings for operating conditions.

2.2 HEAT RECOVERY HEAT EXCHANGERS

A. Fixed-Plate, Heat Exchanger:
1. Airflow Arrangement: Cross flow; shipped loose, field installed.
2. Heat Rate Control Method: Ducted bypass damper.
3. Construction: Aluminum assembly in galvanized steel frame or mounting structure.
4. Face Velocity: 200 fpm.
5. Sensible Heat Effectiveness: 50 percent.
6. Exhaust Air Transfer Ratio (EATR): 0.0 percent.
7. Outdoor Air Correction Factor (OACF): 0.97.
8. Drain: Provide drain for condensate or wash-down fluid removal.
9. Service Temperature Range: 32 to 90 degrees F.
10. Electrical: 24 VAC, 1-phase with single point connection for bypass damper operator.
11. Certification: AHRI 1060 (I-P) labeled, include copy of published ratings for operating conditions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that structure is ready for installation including openings, ductwork, mechanical utilities, and electrical utilities.

B. Rooftop Installation: Verify that equipment supplied roof curbs are installed and ready to receive intended unit otherwise provide equipment matched roof curbs; see Section 07 72 00.

3.2 INSTALLATION

A. Install equipment in accordance with manufacturer's written installation instructions.

B. Do not obstruct maintenance access to equipment piping, electrical conduit, or any other utility.

C. Coordinate installation and fire alarm system interface of system compatible duct-mounted smoke detectors and other appurtenances following NFPA 90A guidelines.

D. Start system and adjust controls and equipment for satisfactory operation.

E. Coordinate hardwired or software interfacing links to enable coordinate as minimum start-stop, occupied, unoccupied functions as well as specific schedules and setpoints functions with other DDC controls onboard airside systems serving common spaces; see Section 23 09 23.

3.3 SYSTEM STARTUP

A. Provide services of manufacturer's authorized representative to provide start up of unit.

3.4 CLEANING

A. Clean filters, air plenums, interior and exposed-to-view surfaces prior to Substantial Completion.

3.5 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals for additional submittals.

B. Training: Train Owner's personnel on operation and maintenance of system.
   1. Training Reference: Operation and maintenance manual and additional training materials as required.
   2. Provide minimum of two hours of training.

END OF SECTION

SECTION 23 73 13
MODULAR INDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Casing construction.

B. Fan section.

C. Coil section.

D. Filter and air cleaner section.

E. Damper section.

1.2 RELATED REQUIREMENTS

A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

B. Section 23 07 19 - HVAC Piping Insulation.

C. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.

D. Section 23 82 00 - Convection Heating and Cooling Units: Air coils.

1.3 REFERENCE STANDARDS

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.

B. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addendum (2011).

C. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.

D. AMCA 99 - Standards Handbook; 2016.

E. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.

F. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

G. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.

H. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.

I. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.

J. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating; 2011 (Reapproved 2017).

M. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

N. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other trades for installation of roof mounted air handling units on roof curbs.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:
1. Published Literature: Indicate dimensions, weights, capacities, ratings, gauges and finishes of materials, and electrical characteristics and connection requirements.
2. Filters: Data for filter media, filter performance data, filter assembly, and filter frames.
3. Fans: Performance and fan curves with specified operating point clearly plotted, power, RPM.
4. Sound Power Level Data: Fan outlet and casing radiation at rated capacity.
5. Electrical Requirements: Power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

C. Executed Warranty: Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.

B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

C. Do not operate units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Trane Inc: www.trane.com/#sle.

2.2 CASING CONSTRUCTION

A. Full Perimeter Base Rail:
1. Construct of galvanized steel.
2. Provide base rail of sufficient height to raise unit for external trapping of condensate drain pans.

B. Casing:
1. Construct of one piece, insulated, double wall panels.

2. Provide mid-span, no through metal, internal thermal break.
3. Construct outer panels of galvanized steel and inner panels of galvanized steel.
4. Casing Air Pressure Performance Requirements:
   a. Able to withstand up to 8 inches w.g. positive or negative static pressure.
   b. Not to exceed 0.0042 inches per inch deflection at 1.5 times design static pressure up to a maximum of plus 8 inches w.g. in positive pressure sections and minus 8 inches w.g. in negative pressure sections.

C. Access Doors:
1. Construction, thermal and air pressure performance same as casing.
2. Provide surface mounted handles on hinged, swing doors.

D. Outside Air and Exhaust Air Weather Hood:
1. Fabricate from same material as casing outer panel.
2. Extend hood past perimeter of unit casing opening so as not to instruct airflow path.
3. Paint hoods with same finish as external surface of outdoor units.
4. Provide inlet hood for each fresh air damper with a sine wave moisture eliminator to prevent entrainment of water into the unit from outside air.
5. Provide exhaust hoods for each exhaust air opening.
6. Size each hood for 100 percent of nominal fresh air damper capacities.
7. Protect each hood with bird screen to prevent nesting at intake or exhaust air flow paths.

E. Unit Flooring: Construct with sufficient strength to support expected people and equipment loads associated with maintenance activities.

F. Casing Leakage: Seal joints and provide airtight access doors so that air leakage does not exceed one percent of design flow at the specified casing pressure.

G. Insulation:
1. Provide minimum thermal thickness of 12 R throughout.
2. Completely fill panel cavities in each direction to prevent voids and settling.
3. Comply with NFPA 90A.

H. Drain Pan Construction:
1. Provide cooling coil and humidifier sections with an insulated, double wall, galvanized steel drain pan complying with ASHRAE Std 62.1 for indoor air quality and sufficiently sized to collect all condensate.
2. Slope in two planes to promote positive drainage and eliminate stagnate water conditions.
3. Locate outlet of sufficient diameter at lowest point of pan to prevent overflow at normal operating conditions.
4. Provide threaded drain connections constructed of drain pan material, extended sufficient distance beyond the base to accommodate field installed, condensate drain trapping.

I. Louvers: Stationary, of galvanized steel, 4 inch deep with plenum, nylon bearings, 1/2 inch mesh, 0.04 inch galvanized wire bird screen in aluminum frame, and bearing AMCA Certified Ratings Seal in accordance with AMCA 500-L. Furnish adjustable louvers with hollow vinyl bulb edging on blades and foam side stops to limit leakage to maximum 2 percent at 4 inch wg differential pressure when sized for 2000 fpm face velocity.

J. Finish:
1. Outdoor Units:
   a. Coat external surface of unit casing with primer and minimum 1.5 mil, enamel paint finish.
   b. Comply with salt spray test in accordance with ASTM B177/B177M.
   c. Color: Manufacturer's standard color.

2.3 FAN SECTION

A. Type: Forward curved, single width, single inlet, centrifugal plug type fan, in compliance with AMCA 99.

B. Performance Ratings: Determined in accordance with AMCA 210 and labeled with AMCA Certified Rating Seal.

C. Sound Ratings: AMCA 301; tested to AMCA 300 and label with AMCA Certified Sound Rating Seal.

D. Bearings: Self-aligning, grease lubricated, with lubrication fittings extended to exterior of casing with plastic tube and grease fitting rigidly attached to casing.

E. External Motor Junction Box: Factory mount NEMA 4 external junction box and connect to extended motor leads from internally mounted motors.

F. Motor Wiring Conduit: Factory wire fan motor wiring to the unit mounted starter-disconnect, variable frequency drive, and external motor junction box.

G. Fan Accessories:

H. Flexible Duct Connections:
1. For separating fan, coil, and adjacent sections.

I. Drives:
1. Comply with AMCA 99.
2. Bearings: Heavy duty pillow block type, ball bearings, with ABMA STD 9, L-10 life at 50,000 hours.

J. Shafts: Solid, hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

K. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts, and keyed. Variable and adjustable pitch sheaves for motors 15 hp and under selected so required rpm is obtained with sheaves set at mid-position; fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

L. Belt Guard: Fabricate to SMACNA (DCS); 0.106 inch thick, 3/4 inch diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

2.4 COIL SECTION

A. Casing: Provide access to both sides of coils. Enclose coils with headers and return bends exposed outside casing. Slide coils into casing through removable end panel with blank off sheets and sealing collars at connection penetrations.

B. Drain Pans: 24 inch downstream of coil and down spouts for cooling coil banks more than one coil high.

C. Eliminators: Three break of galvanized steel, mounted over drain pan.

D. Air Coils:
1. Certify capacities, pressure drops, and selection procedures in accordance with AHRI 410.

E. Fabrication:
1. Tubes: 5/8 inch OD seamless copper expanded into fins, brazed joints.

2. Fins: Aluminum.
3. Casing: Die formed channel frame of galvanized steel.

F. Water Heating Coils:
1. Headers: Cast iron, seamless copper tube, or prime coated steel pipe with brazed joints.
2. Configuration: Drainable, with threaded plugs for drain and vent; serpentine type with return bends on smaller sizes and return headers on larger sizes.

2.5 FILTER AND AIR CLEANER SECTION

A. General: Provide filter sections with filter racks, minimum of one access door for filter removal, and filter block-offs to prevent air bypass.

B. Differential Pressure Gauge:
1. Provide factory installed dial type differential pressure gauge, flush mounted with casing outer wall, and fully piped to both sides of each filter to indicate status.
2. Maintain plus/minus 5 percent accuracy within operating limits of 20 degrees F to 120 degrees F.

2.6 DAMPER SECTION

A. Mixing Section: Provide a functional section to support the damper assembly for modulating the volume of outdoor, return, and exhaust air.

B. Damper Blades:
1. Double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on each blade.
2. Self-lubricating stainless steel or synthetic sleeve bearings.
3. Comply with ASHRAE Std 90.1 I-P for rated maximum leakage rate.
4. Provide leakage testing and pressure ratings in compliance with AMCA 500-D test methods.
5. Arrange in parallel or opposed-blade configuration.

C. Barometric Relief Dampers:
1. Frame: Roll formed galvanized steel.
2. Blades: Roll formed galvanized steel.
3. Blade Seals: Extruded vinyl, mechanically attached to the blade edge.
4. Material:

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Bolt sections together with gaskets.

C. Provide fixed sheaves required for final air balance.

D. Make connections to coils with unions or flanges.

E. Hydronic Coils:
1. Hydronic Coils: Connect water supply to leaving air side of coil (counterflow arrangement).
2. Provide shut-off valve on supply line and lockshield balancing valve with memory stop on return line.
3. Locate water supply at bottom of supply header and return water connection at top.

4. Provide manual air vents at high points complete with stop valve.
5. Ensure water coils are drainable and provide drain connection at low points.

3.2 SYSTEM STARTUP

A. Provide manufacturer's field representative to perform systems startup.

B. Prepare and start equipment and systems in accordance with manufacturers' instructions and recommendations.

C. Adjust for proper operation within manufacturer's published tolerances.

3.3 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate operation of system to Owner's personnel.
1. Use operation and maintenance data as reference during demonstration.
2. Briefly describe function, operation, and maintenance of each component.

B. Training: Train Owner's personnel on operation and maintenance of system.
1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.

END OF SECTION

SECTION 23 74 13
PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Packaged roof top unit.

B. Unit controls.

C. Remote panel.

D. Roof mounting curb and base.

E. Maintenance service.

1.2 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.

B. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2015.

C. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks; 2016, with Errata (2018).

D. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange Between Systems Local and Metropolitan Area Networks--Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications ; 2016, with Errata (2017).

E. Modbus (PS) - The Modbus Organization Communications Protocol; Latest Update.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Trane, a brand of Ingersoll Rand: www.trane.com/#sle.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MANUFACTURED UNITS

A. General: Roof mounted units having gas burner and electric refrigeration.

B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, return fan, heat exchanger and burner, heat recovery coil, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.

2.3 FABRICATION

A. Cabinet: Steel with baked enamel finish, including access panels with screwdriver operated flush cam type fasteners. Structural members shall be minimum 18 gauge, 0.0478 inch, with access doors or panels of minimum 20 gauge, 0.0359 inch.

B. Insulation: 2 inch thick neoprene coated glass fiber with edges protected from erosion.

C. Heat Exchangers: Aluminized steel, of welded construction.

D. Supply and Return Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch pulley, and rubber isolated hinge mounted high efficiency motor or direct drive as indicated. Isolate complete fan assembly.

2.4 EVAPORATOR COIL

A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.

B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons cooling capacity and larger.

2.5 COMPRESSOR

A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gauge ports, and filter drier.

2.6 CONDENSER COIL

A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil guard.

B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.

2.7 OPERATING CONTROLS

A. Provide terminal strip on unit for connection of operating controls to remote panel by others. Control shall allow for two stages of heating and two stages cooling.

B. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135, BACnet MS/TP.

C. External Point Mapping: Provide mapping table for each parameter included in the local visual interface with software-toggle flag to allow reduced mapping of available points.

D. Control Valves: Field-installed, modulating, ball type with position tracking; see Section 25 35 19.

2.8 REHEAT COIL

A. Provide copper tube aluminum fin coil assembly with multiple circuits arranged to provide modulating reheat.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that proper power supply is available.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

3.3 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Demonstrate operation to Owner's maintenance personnel.

3.5 MAINTENANCE

A. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibration.

B. Provide 24-hour emergency service on breakdowns and malfunctions.

C. After each service call, submit copy of service call work order or report that includes description of work performed.

END OF SECTION

SECTION 23 81 29
VARIABLE REFRIGERANT FLOW (VRF) SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air-source outdoor units.

B. Refrigerant piping.

C. Indoor Units.

D. Controls.

1.2 REFERENCE STANDARDS

A. AHRI 1230 - Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-conditioning and Heat Pump Equipment; 2014, with Addendum 1.

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASHRAE Std 90.1 I-P-2019 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2019.

D. ASTM D3451 - Standard Guide for Testing Coating Powders and Powder Coatings; 2006 (Reapproved 2017).

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

F. ISO 14001 - Environmental Management Systems — Requirements with Guidance for Use; 2015.

G. ISO 9001 - Quality management systems -- Requirements; 2015.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's standard data sheets for each item of equipment, marked to correlate to equipment item markings indicated in Contract Documents:

C. Operating and Maintenance Data:
   1. Manufacturer's complete standard instructions for each unit of equipment and control panel.
   2. Custom-prepared system operation, troubleshooting, and maintenance instructions and recommendations.
   3. Identification of replaceable parts and local source of supply.

D. Manufacturer's qualification statement.

E. Installer's qualification statement.

F. Warranty: Executed warranty, made out in Owner's name.

1.4 QUALITY ASSURANCE

A. The units shall be listed by Electrical Testing Laboratories (ETL) and bear the ETL label.

B. All wiring shall be in accordance with the NFPA 70.

C. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

D. All units must meet or exceed the 2010 Federal minimum efficiency requirements and the ASHRAE Std 90.1 I-P-2019 efficiency requirements for VRF systems. Efficiency shall be published in accordance with the Air-Conditioning, Heating, and Refrigeration Institute AHRI 1230.

E. Manufacturer shall have a minimum of fifteen (15) years continuous experience providing VRF systems in the U.S. market.

F. Installer Qualifications: Minimum five years experienceTrained and approved by manufacturer of equipment.

G. System start-up supervision shall be a required service to be completed by the manufacturer or a duly authorized, competent representative that has been factory trained in system configuration and operation. The representative shall provide proof of manufacturer certification indicating successful completion within no more than two (2) years prior to system installation. This certification shall be included as part of the equipment and/or controls submittals.

H. Manufacturer shall provide on-site supervision and commissioning for the full duration of the project at no additional cost.

1.5 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturer’s recommendation.

1.6 WARRANTY

A. The units shall be covered by the manufacturer’s limited warranty for a period of one (1) year parts and seven (7) year compressor to the Owner from date of installation.

B. Manufacturer shall provide 1st year labor warranty.

C. Installing contractor shall meet manufacturer requirements to obtain extended manufacturer’s limited parts and compressor warranty for a period of ten (10) years to the Owner from date of installation. This warranty shall not include labor.

D. All manufacturer technical and service manuals must be readily available for download by any local contractor should emergency service be required. Registering and sign-in requirements which may delay emergency service reference are not allowed.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

A. Mitsubishi Electric; CITY MULTI VRF zoning system: www.mitsubishicomfort.com.

B. Or Approved Equal.

C. Substitutions: See Section 01 60 00 - Product Requirements for substitution procedures.

2.2 OUTDOOR UNITS

A. Y-SERIES STANDARD EFFICIENCY (HEAT PUMP), AIR-COOLED

B. General:
1. The outdoor unit modules shall be air-cooled, direct expansion (DX), multi-zone units used specifically with VRF components described in this section and Controls article. The outdoor unit modules shall be equipped with a single compressor which is inverter-driven and multiple circuit boards—all of which must be manufactured by the branded VRF manufacturer. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.
2. Outdoor unit systems may be comprised of multiple modules with differing capacity if a brand other than basis of design is proposed. All units requiring a factory supplied twinning kits shall be piped together in the field, without the need for equalizing line(s). If an alternate manufacturer is selected, any additional material, cost, and labor to install additional lines shall be incurred by the contractor. Contractor responsible for ensuring alternative brand compatibility in terms of availability, physical dimensions, weight, electrical requirements, etc.
3. Outdoor unit shall have a sound rating no higher than 65 dB(A) individually or 70 dB(A) twinned. Units shall have a sound rating no higher than 52 dB(A) individually or 54.5 dB(A) twinned while in night mode operation. Units shall have 5 levels sound adjustment via dip switch selectable fan speed settings. If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.
4. Refrigerant lines from the outdoor unit to the indoor units shall be insulated in accordance with the installation manual.
5. The outdoor unit shall have the capability of installing the main refrigerant piping through the bottom of the unit.
6. The outdoor unit shall have an accumulator with refrigerant level sensors and controls. Units shall actively control liquid level in the accumulator via Linear Expansion Valves (LEV) from the heat exchanger.
7. The outdoor unit shall have a high pressure safety switch, over-current protection, crankcase heater and DC bus protection.
8. VRF system shall meet performance requirements per schedule and be within piping limitations & acceptable ambient temperature ranges as described in respective manufacturers' published product catalogs. Non-published product capabilities or performance data are not acceptable.
9. The outdoor unit shall be capable of guaranteed operation in heating mode down to -18°F ambient temperatures and cooling mode up to 126°F without additional restrictions on line length & vertical separation beyond those published in respective product catalogs. Models with capacity data for required temperature range published as "for reference only" are not considered capable of guaranteed operation and are not acceptable. If an alternate manufacturer is selected, any additional material, cost, and labor to meet ambient operating range and performance shall be incurred by the contractor.
10. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained. Oil return sequences must be enabled only during extended periods of reduced refrigerant flow to ensure no disruption to correct refrigerant flow to individual zones during peak loads. Systems which might engage oil return sequence based on hours of operation risk oil return during inopportune periods are not allowed. Systems which rely on sensors (which may fail) to engage oil return sequence are not allowed.
11. Unit must defrost all circuits simultaneously in order to resume full heating more quickly during extreme low ambient temperatures (below 23F). Partial defrost, also known as hot

gas defrost which allows reduced heating output during defrost, is permissible only when ambient temperature is above 23F.

12. While in hot gas defrost the system shall slow the indoor unit fan speed down to maintain a high discharge air temperature, systems that keep fan running in same state shall not be allowed as they provide an uncomfortable draft to the indoor zone due to lower discharge air temperatures.
13. The outdoor unit shall be provided with a manufacturer supplied 20 gauge hot dipped galvanized snow /hail guard. The snow/hail guard protects the outdoor coil surfaces from hail damage and snow build-up in severe climates.
14. VRF four-legged outdoor unit mounting systems shall be provided by manufacturer. Stand shall be made from 7 gauge plate steel with thermally fused polyester powder coat finish that meets ASTM D3451 standards. Stands shall be provided with galvanized mounting hardware and meets all ASCE 7 overturning safety requirement.

C. Unit Cabinet:
   1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished.
   2. The outdoor unit shall be tested in compliance with ISO9277 such that no unusual rust shall develop after 960 hours of salt spray testing.
   3. Panels on the outdoor unit shall be scratch free at system startup. If a scratch occurs the salt spray protection is compromised and the panel should be replaced immediately.

D. Fan:
   1. Each outdoor unit module shall be furnished with direct drive, variable speed propeller type fan(s) only. Fans shall be factory set for operation at 0 in. WG external static pressure, but capable of normal operation with a maximum of 0.32 in. WG external static pressure via dipswitch.
   2. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
   3. All fans shall be provided with a raised guard to prevent contact with moving parts.

E. Refrigerant and Refrigerant Piping
   1. R410A refrigerant shall be required for systems.
   2. Polyolester (POE) oil—widely available and used in conventional domestic systems—shall be required. Prior to bidding, manufacturers using alternate oil types shall submit safety data sheets (SDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.
   3. Refrigerant piping shall be phosphorus deoxidized copper (copper and copper alloy seamless pipes) of sufficient radial thickness as defined by the VRF equipment manufacturer and installed in accordance with manufacturer recommendations.
   4. All refrigerant piping must be insulated with ½" closed cell, CFC-free foam insulation with flame-Spread Index of less than 25 and a smoke-development Index of less than 50 as tested by ASTM E84. R value of insulation must be at least 3.
   5. Refrigerant line sizing shall be in accordance with manufacturer specifications.

F. Coil:
   1. Outdoor Coil shall be constructed to provide equal airflow to all coil face surface are by means of a 4-sided coil.
   2. Outdoor Coil shall be elevated at least 12 inches from the base on the unit to protect coil from freezing and snow build up in cold climates. Manufacturer's in which their coil extends to within a few inches from the bottom of their cabinet frame shall provide an additional 12 inches of height to their stand or support structure to provide equal protection from elements as Mitsubishi Electric basis of design. Any additional support costs, equipment fencing, and tie downs required to meet this additional height shall be responsibility of Mechanical Contractor to provide.
   3. The outdoor heat exchanger shall be of zinc coated aluminum construction with turbulating flat tube construction. The coil fins shall have a factory applied corrosion resistant finish. Uncoated aluminum coils/fins are not allowed.
   4. The coil shall be protected with an integral metal guard.

5. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
6. Unit shall have prewired plugs for optional panel heaters in order to prevent any residual ice buildup from defrost. Panel heaters are recommended for operating environments where the ambient temperature is expected to stay below -1F for 72 hours.
7. Condenser coil shall have active hot gas circuit direct from compressor discharge on lowest coil face area to shed defrost condensate away from coil and protect from Ice formation after returning to standard heat pump operation. While in Heat Pump operation this lower section of the Outdoor Evaporator coil shall continually run hot gas from the compressor discharge to protect the coil from ice buildup and coil rupture. Manufacturers who do not have an active hot gas circuit in the lower section of the Outdoor coil to protect coil from freezing shall not be allowed to bid on project in markets where the outdoor unit will see temperatures below freezing.

G. Compressor:
1. Each outdoor unit module shall be equipped with only inverter driven scroll hermetic compressors. Non inverter-driven compressors, which may cause inrush current (demand charges) and require larger generators for temporary power shall not be allowed.
2. Each compressor shall be equipped with a multi-port discharge mechanism to eliminate over compression at part load. Manufacturer's that rely on a single compressor discharge port and provide no means of eliminating over compression and energy waste at part load shall not be allowed.
3. Crankcase heat shall be provided via induction-type heater utilizing eddy currents from motor windings. Energy-wasting "belly-band" type crankcase heaters are not allowed. Manufacturers that utilize belly-band crankcase heaters will be considered as alternate only.
4. Compressor shall have an inverter to modulate capacity. The capacity for each compressor shall be variable with a minimum turndown not greater than 15%.
5. The compressor shall be equipped with an internal thermal overload.
6. Field-installed oil equalization lines between modules are not allowed. Prior to bidding, manufacturers requiring equalization must submit oil line sizing calculations specific to each system and module placement for this project.
7. Manufacturers that utilize a compressor sump oil sensor to equalize compressor oil volume within a single module shall not be allowed unless they actively shut down the system to protect from compressor failure.

H. Controls:
1. The unit shall be an integral part of the system & control network described in Controls article and react to heating/cooling demand as communicated from connected indoor e control circuit. Required field-installed control voltage transformers and/or signal boosters shall be provided by the manufacturer.
2. The outdoor unit shall have the capability of 4 levels of demand control for each refrigerant system based on external input.

I. Electrical:
1. The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz or 460 volts, 3-phase, 60 hertz per equipment schedule.
2. The outdoor unit shall be controlled by integral microprocessors.
3. The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

2.3 INDOOR UNITS

A. 4-WAY CEILING-RECESSED CASSETTE WITH GRILLE FOR 2X2 GRID

B. General:

1. The indoor unit shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL 1995.

C. Unit Cabinet:
   1. The cabinet shall be a compact 22-7/16 inches wide x 22-7/16 inches deep so it will fit within a standard 24 inch square suspended ceiling grid.
   2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
   3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

D. Fan:
   1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
   2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
   3. The indoor fan shall be capable of three (3) speed settings, Low, Mid, and High.
   4. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
   5. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
   6. Grille shall include an optional “3D i-see” sensor, or equal, to work in conjunction with indoor unit control sequence to prevent unnecessary cooling or heating in unoccupied areas of the zone without decreasing comfort levels. Sensor must detect occupancy (not simply motion) and location of occupants by measuring size & temperature of objects within a 39 foot detecting diameter (based on 8.8 foot mounting height) with 1,856 or more measuring points.

E. Filter:
   1. Return air shall be filtered by means of a long-life washable filter.

F. Coil:
   1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
   2. The coils shall be pressure tested at the factory.
   3. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 19-3/4 inches above the condensate pan.

G. Electrical:
   1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
   2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

H. Controls:
   1. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
   2. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point.
   3. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies.
   4. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

5. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur, the control shuts down the indoor unit before an overflow can occur. A thermistor error code will be produced should the sensor activate indicating a fault which must be resolved before the unit re-starts.
6. Control board shall include contacts for control of no less than two stages of external heat. The first stage of external heat may be energized when the space temperature is 2.7°F from set point for between 10-25 minutes (user adjustable). The second stage of external heat may be energized when the first stage has been active for no less than 5 minutes and the space temperature has not risen by more than 0.9°F.

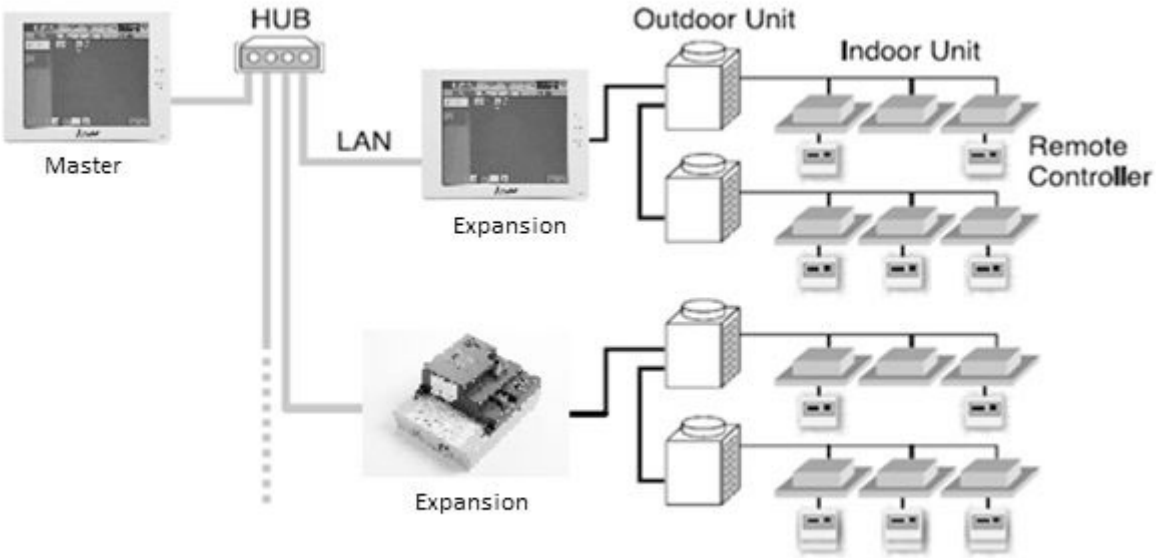
2.4 CONTROLS

A. General
1. The control system shall consist of a low voltage communication network and a web-based interface. The controls system shall gather data and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface.
2. Furnish energy conservation features such as optimal start, request-based logic, and demand level adjustment of overall system capacity as specified in the sequence.
3. System shall be capable of email generation for remote alarm annunciation.

B. Electrical Characteristics
1. General:
   a. Controller power and communications shall be via a common non-polar communications bus and shall operate at 30VDC.
2. Wiring:
   a. Control wiring shall be installed in a daisy chain configuration from indoor unit to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit.
   b. Control wiring for centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to the system controllers (centralized controllers and/or integrated web based interface), to the power supply.
3. Wiring type:
   a. Wiring shall be 2-conductor (16 AWG), twisted, stranded, shielded wire as defined by the Diamond System Builder output.
   b. Network wiring shall be CAT-5 with RJ-45 connection.

2.5 CITY MULTI CONTROLS NETWORK

A. The CITY MULTI Controls Network (CMCN) consists of remote controllers, centralized controllers, and/or integrated web based interface communicating over a high-speed communication bus. The CITY MULTI Controls Network shall support operation monitoring, scheduling, occupancy, error email distribution, personal web browsers, tenant billing, online maintenance support, and integration with Building Management Systems (BMS) using either LonWorks® or BACnet® interfaces. The below figure illustrates a sample CMCN System Configuration.

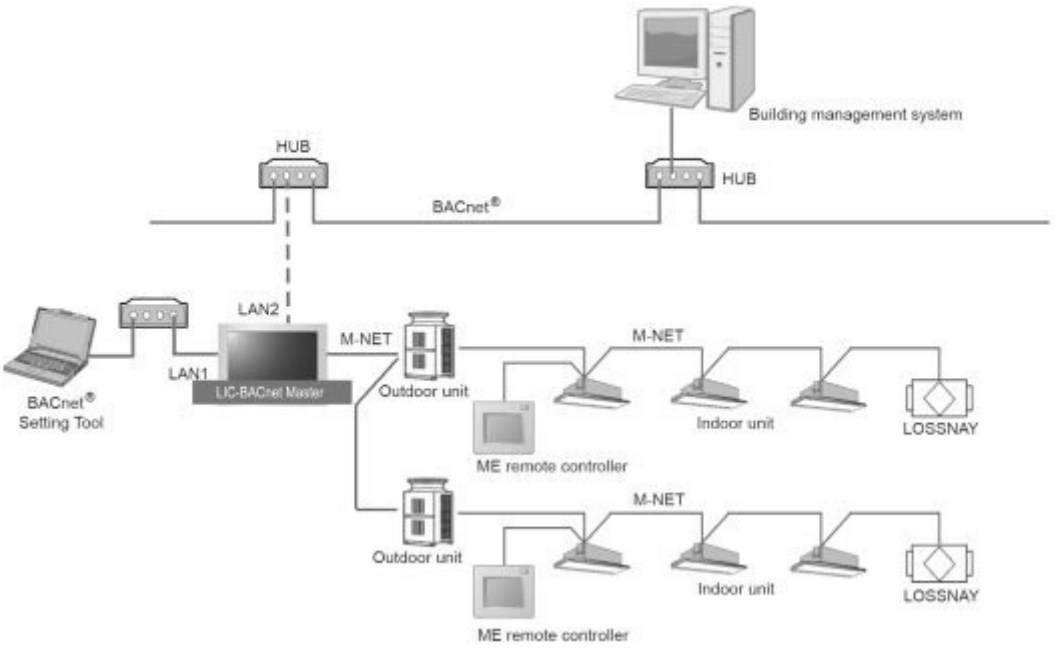


2.6 CMCN SYSTEM CONFIGURATION

A. CMCN: SYSTEM INTEGRATION
1. BACnet® Integration:
   a. The Mitsubishi Electric Cooling & Heating BACnet® hardware, which is built into all networked central controllers, shall be compliant with BACnet® Protocol (ANSI/ASHRAE 135-2010) and be Certified by the (BTL) BACnet® Testing Laboratories. The BACnet® interface shall support BACnet Broadcast Management (BBMD). The BACnet® interface shall support a maximum of 50 indoor units. Operation and monitoring points include, but are not limited to, on/off, operation mode, fan speed, prohibit remote controller, filter sign reset, alarm state, error code, and error address.
2. Licenses:
   a. LIC-BACnet Master: Master Controller license for Master Centralized Controller and Non Touch Screen, Networked Centralized Controller
3. LIC-BACnet Specifications:
   a. Control up to 50 groups
   b. 1 to 16 indoor units can be collectively controlled in a group
   c. Supports dual set point functionality (connected model dependant)
   d. BTL Compliant
   e. BACnet communication specifications are based on ANSI/ASHRAE Standards 135-2010
4. PC Requirements:
   a. CPU: 1GHz or higher
   b. Memory: 1GB or more
   c. HDD Space: 100 MB or more
   d. Screen Resolution: 1024 x 768 or higher
   e. OS: Microsoft Windows 7 32-bit/64-bit, Microsoft 8.1 32-bit/64-bit. Not compatible with Windows Vista
   f. Execution Environment: Microsoft .NET Framework 4.5 or later

g. Others: Pointing device such as a mouse, internet connection (required when installing a .NET Framework)

5. LIC-BACnet – System Example



A. BACnet Point List

Object List
On Off Setup
On Off State, Number of ON/OFF, Cumulative operation time
Alarm Signal (4-digit error code)
Error Code
Operational Mode Setup
Operational Mode State
Fan Speed Setup
Fan Speed State
Room Temp [Water Temp]
Set Temp [Set Water Temp]

Set Temp Cool
Set Temp Heat
Set Temp Auto
Filter Sign [Circulating Water Exchange Sign]
Filter Sign Reset [Circulating Water Exchange Sign Reset]
Prohibition On Off
Prohibition Mode
Prohibition Filter Sign Reset [Prohibition Circulating Water Exchange Sign Reset]
Prohibition Set Temperature
M-NET Communication State
System Forced Off
Air Direction Setup
Air Direction State
Set High Limit Setback Temp
Set Low Limit Setback Temp
Ventilation Mode Setup
Ventilation Mode State
Air To Water Mode Setup
System Alarm Signal (4-digit error code)
PI Controller Alarm Signal (4-digit error code)
Group Apportioned Electric Energy
Interlocked Units Apportioned Electric Energy
PI controller Electric Energy 1–4
Pulse Input Electric Energy 1–4
Group Apportionment Parameter
Interlocked Units Apportionment Parameter

Night Purge State
Thermo On Off State
Trend Log Room Temp
Trend Log Group Apportioned Electric Energy
Trend Log Interlocked Units Apportioned Electric Energy
Trend Log PI controller Electric Energy 1–4
Trend Log Pulse Input Electric Energy 1–4
Trend Log Group Apportionment Parameter
Trend Log Interlocked Units Apportionment Parameter

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that required electrical services have been installed and are in the proper locations prior to starting installation.

B. Verify that condensate piping has been installed and is in the proper location prior to starting installation.

C. Notify Architect if conditions for installation are unsatisfactory.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install refrigerant piping in accordance with equipment manufacturer's instructions.

C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).

D. Coordinate with installers of systems and equipment connecting to this system.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide manufacturer's field representative to inspect installation prior to startup.

3.4 SYSTEM STARTUP

A. Provide manufacturer's field representative to perform system startup.

B. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.

C. Adjust equipment for proper operation within manufacturer's published tolerances.

3.5 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Clean exposed components of dirt, finger marks, and other disfigurements.

3.6 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Demonstrate proper operation of equipment to Owner's designated representative.

C. Demonstration: Demonstrate operation of system to Owner's personnel.
   1. Use operation and maintenance data as reference during demonstration.
   2. Briefly describe function, operation, and maintenance of each component.

D. Training: Train Owner's personnel on operation and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.

3.7 PROTECTION

A. Protect installed components from subsequent construction operations.

B. Replace exposed components broken or otherwise damaged beyond repair.

END OF SECTION

SECTION 23 82 00
CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic or steam finned tube radiation.

B. Unit ventilators.

C. Blower-coil units.

D. Duct-mounted coils.

1.2 RELATED REQUIREMENTS

A. Section 23 09 93 - Sequence of Operations for HVAC Controls.

B. Section 23 21 13 - Hydronic Piping.

C. Section 23 21 14 - Hydronic Specialties.

D. Section 23 31 00 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); current edition at www.ahrinet.org.

B. AHRI 350 - Sound Performance Rating of Non-Ducted Indoor Air-Conditioning and Heat Pump Equipment; 2015.

C. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addendum (2011).

D. AHRI 840 - Unit Ventilators; 1998.

E. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.

G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide typical catalog of information including arrangements.

C. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 HYDRONIC FINNED TUBE RADIATION

A. Required Directory Listing: AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); current edition at www.ahrinet.org.

B. Element Hangers: Quiet operating, ball bearing cradle type providing unrestricted longitudinal movement, on enclosure brackets.

C. Enclosures: 18 gauge, 0.0478 inch sheet steel up to 18 inches in height, 16 gauge, 0.0598 inch sheet steel over 18 inches in height or aluminum as detailed, with easily jointed components for wall to wall installation.

D. Finish: Factory applied baked primer coat.

E. Damper: Where not thermostatically controlled, provide knob-operated internal damper at enclosure air outlet.

F. Access Doors: For otherwise inaccessible valves, provide factory-made permanently hinged access doors, 6 by 7 inch minimum size, integral with cabinet.

2.2 UNIT VENTILATORS

A. Performance Data and Safety Requirements:
1. Unit capacities certified and tested in accordance with AHRI 840 and AHRI 350.
2. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.

B. Required Directory Listings: AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

C. Hydronic Coils:
1. Copper tubes mechanically expanded or bonded into evenly spaced aluminum fins.
2. Factory pressure tested, hydrostatically, to not less than 350 psi.
3. Provide insulated drain pan under chilled water coils, to prevent sweating, with field convertible left or right hand drain connections.

D. Cabinet: 14 gauge, 0.0747 inch sheet steel on solid base pan with exposed edges rounded. Provide removable front panels with quick-acting, key-operated cam locks. Provide removable die-cast or fabricated steel discharge grilles. For units having cooling coils, insulate internal parts and surfaces exposed to conditioned air stream with moisture resistant insulation.

E. Cabinet Accessories: Matching steel construction, reinforced, for use with unit ventilators or finned radiation, with steel alignment pins, adjustable kick plates with leveling bolts, shelves and sliding doors with locks as indicated, sinks, bubbler faucets and bowls, corner, end, and wall filler sections as required.

F. Finish: Factory applied baked primer coat on visible surfaces of enclosure or cabinet.

G. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven, arranged to draw air through coil.

H. Wall Louvers: Anodized aluminum wall intake box and louvers removable from frame with 1/2 inch square mesh galvanized screen in back of louver.

I. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

J. Controls:
1. Provide units with control valves furnished by the automatic temperature controls manufacturer.
2. Provide ASHRAE Cycle I as defined in ASHRAE (HVACA) Handbook - HVAC Applications.

K. Filter: Easily removed 1 inch thick glass fiber throw-away type, located to filter air before coil.

L. Mixing Dampers: Multi-blade with compressible seal, capable of varying proportion of mixed air from 100 percent room air to 100 percent outside air.

2.3 BLOWER-COIL UNITS

A. Manufacturers:
1. Trane, a brand of Ingersoll Rand: www.trane.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Performance Data and Safety Requirements:
1. Coils rated and tested in accordance with AHRI 410.
2. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.
3. Comply with NFPA 90A for unit construction, including filters and related equipment, for protection of life and property from fire, smoke, and gases resulting from conditions having manifestations similar to fire.

C. Unit Casing:
1. Fabricate from heavy gauge galvanized steel sheet.
2. Insulate inside walls with 1 inch thick, fiberglass insulation for thermal and acoustical control.
3. Provide access panels allowing servicing of coils, drain pan, fan, motor, and drive.
4. Provide knockouts or hanger rod holes at all four corners for suspended units.

D. Air Coils:
1. Aluminum fins mechanically expanded or bonded to copper tubes having standard sweat connections.

E. Fans: Forward curved, centrifugal blower, dynamically balanced, adjustable speed V-belt drive with fan shaft supported by heavy-duty, permanently sealed ball bearings.

F. Drain Pan: Cleanable, one-piece construction of polymer, galvanized steel, or stainless steel; with drain connection and sloped for positive drainage.

G. Filters: Fully accessible, flat filter rack with throw-away filters.

H. Motors: Single speed with sleeve or ball bearings, 1,750 rpm, wired to unit junction box, and mounted on a resilient motor base.

I. Electrical Controls:
1. Terminal strip for connection of field wiring.

2.4 DUCT-MOUNTED COILS

A. Water Coils:
1. Coils rated and tested in accordance with AHRI 410.
2. Tubes: Material to consist of seamless copper or brass, mechanically expanded or tension wound to fins; appropriate tube joining methods based on tube material.
3. Fins: Material to consist of aluminum or copper, continuous plate type with full fin collars or individual helical finned tube type wound under tension.
4. Casing: Heavy gauge galvanized steel with mounting holes, including intermediate tube supports if required by coil design and length.
5. Headers (Manifolds): Construct of seamless copper pipe, cast iron, or nonferrous material with tube connection appropriate to header material provided.
6. Acceptable Factory Testing Methods:

B. Electric Coils:
1. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.
2. Heater Controls:
a. Supply duct temperature sensor.
b. Coil temperature limit switch.
c. Air velocity sensor.
d. Interlocked airflow switch.
e. Interlocked disconnect switch.

2.5 HOSE KITS AND VALVES

A. Hoses:
1. Provide hoses for all units for connection to main water supply and return headers.
2. Length: 2 feet.
3. Material: Braided stainless steel rated to minimum 400 psi at 265 degrees F.

B. Automatic Balancing Valves:
1. Brass body for shutoff and hydronic balancing.

C. Ball Valves:
1. Brass body for shutoff and hydronic balancing.
2. Provide memory, memory stop, and pressure/temperature ports.

D. Y Strainers:
1. Bronze body.
2. "Y" type configuration with brass cap.
3. Maximum Operating Pressure: Minimum 450 psi.
4. Screen: Stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are suitable for installation.

B. Verify that field measurements are as indicated on drawings.

3.2 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Install equipment exposed to finished areas after walls and ceilings are finished and painted.

C. Do not damage equipment or finishes.

D. Finned Tube Radiation:
1. Locate on outside walls and run cover continuously wall-to-wall unless otherwise indicated.
2. Center elements under window with elements of equal length centered under each window for multiple windows.
3. Install wall angles and end caps where units butt against walls.
4. Align cabinet joints with window mullions.
5. Install wall angles where units butt against walls and align cabinet joints with window mullions.

E. Unit Ventilators:
1. Locate as indicated, level and shim units, and anchor to structure.
2. Coordinate exact location of wall louvers.
3. Install shelving and auxiliary cabinetry.
4. Provide wall trim pieces for continuous wall-to-wall installation.

F. Units with Hydronic Coils:
1. Provide with shut-off valve on supply piping and tamper-proof, balancing valve with memory stop on return piping.
2. If not easily accessible, extend air vent to exterior surface of cabinet for ease of servicing.
3. Provide float operated automatic air vents with stop valve for cabinet unit heaters, fan coil units, and unit heaters.

G. Units with Electric Heating Elements:
1. Install as indicated including electrical devices furnished by manufacturer but not factory installed.

H. Blower-Coil Units:
1. Verify all surfaces and openings at unit location can suitably accommodate unit(s).
2. Install in accordance with manufacturer's recommendations.
3. Provide manual shut-off valve on hydronic supply side of coil and balancing valve with memory stop on return side.
4. General piping installation requirements are specified in other Sections and drawings indicate general arrangement of piping, fittings, and specialties.
5. Connect hydronic to unit.

I. Air Coils:
1. Install in ducts and casings in accordance with SMACNA (DCS).
   a. Support coil sections independent of piping on steel channel or double angle frames and secure to casing.
   b. Provide frames for maximum of three coil sections.
   c. Arrange supports to avoid piercing drain pans.
   d. Provide airtight seals between coil and casing or duct.
2. Coil Safeguards:
   a. Protect coils to prevent damage to flanges and fins.
   b. Comb out damaged fins.
3. Install all coils level except cleanable coils with 1:50 pitch.
4. Make connections to hydronic and steam coils with unions and flanges.
5. Hydronic (Drainable) Coils:
   a. Connect water supply to leaving air side of coil (counterflow arrangement).

b. Provide with shut-off valve on supply piping and tamper-proof, balancing valve with memory stop on return piping.
c. Locate supply water connection on leaving air side at bottom of supply header, and return water connection at top.
d. Provide manual air vents with stop valves at high points.
    1) Install drain connections at low points of installation.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.4 CLEANING

A. After construction and painting is completed, clean exposed surfaces of units.

B. Vacuum clean coils and inside of units.

C. Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.

D. Install new filters.

3.5 PROTECTION

A. Provide finished cabinet units with protective covers during the balance of construction.

END OF SECTION

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General requirements applicable to all components and systems included in Electric Work Prime Contract

B. Products Installed but Not Furnished Under This Section

C. Make all electrical connections to equipment shown on Drawings and furnished by other Prime Contractors. Obtain approved wiring diagrams and location drawings for roughing in and final connections from Prime Contractor furnishing equipment. Provide disconnect switches, push button stations, and similar components, required but not furnished with equipment as shown on Drawings.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements:

B. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

C. Section 01 78 00 - Closeout Submittals: Project record documents.

1.3 REFERENCES

A.	AIA	American Institute of Architects
B.	AISC	American Institute of Steel Construction
C.	ANSI	American National Standards Institute
D.	ASTM	American Society of Testing Materials
E.	IEEE	Institute of Electric and Electronic Engineers
F.	IES	Illuminating Engineering Society
G.	NBFU	National Board of Fire Underwriters
H.	NEC	National Electric Code
I.	NEMA	National Electrical Manufacturers' Association
J.	NETA	International Electrical Testing Association
K.	NFPA	National Fire Protection Association
L.	UL	Underwriters' Laboratories, Inc.

1.4 SYSTEM DESCRIPTIONS

A. Design Requirements - Provide complete systems, properly tested, balanced, and ready for operation including necessary details, items and accessories although not expressly shown or specified, including (but not limited to):
   1. All wiring and conduit for work specified in Project Manual and shown on Drawings.

2. All electrical devices and equipment for work specified in Project Manual and shown on Drawings.

B. Systems included, but not limited to:
1. Electrical Distribution
2. Electrical Connections
3. Electric Layouts: Arrange all panels, disconnect switches, enclosed breakers, equipment, raceways, and similar components neatly, orderly and symmetrically. Provide 3/4-inch plywood backboards for all surface mounted panels, disconnect switches, enclosed breakers, and similar equipment. Arrangements shown on Drawings are diagrammatic only; provide and adjust raceways, wiring, and other components as required.
4. Power Interruptions and Scheduled Outages: Coordinate scheduling of all power interruptions and outages with Owner. EC shall confirm with Owner prior to interruption of power, which building systems are considered critical and must remain operational during the interruption. If a scheduled power outage is to extend beyond one standard workday, EC shall provide temporary power to operate critical building systems (including, but not limited to fire alarm system, security system, building access control system, and building energy management control system).

1.5 QUALITY ASSURANCE

A. Codes and Standards: Comply with all applicable Federal, State and Local Building and Electrical Codes, Laws, Ordinances, and Regulations, and comply with all applicable NFPA, National Electrical Code and Utility Company requirements and regulations. Provide Underwriter's Laboratory Seal on all materials.

B. Permits and Inspections: Obtain all approvals, tests, and inspections required by Architect, Engineer, Local Electrical Inspector, agent or agency specified in Project Manual, or National, State, or Local Codes and Ordinances.

C. Schedule electrical inspection by a third party inspection agency, such as New York State Board of Fire Underwriters or equivalent, acceptable to the local authority having jurisdiction, and submit final inspection certificate to Architect.

D. Furnish all materials and labor necessary for tests and pay all costs associated with tests and inspections.

E. Conduct all tests under load for load balancing and where required by Codes, Regulations, Ordinances, or Technical Specification.

F. Electrical Components, Devices, and Accessories: UL Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Take all reasonable precautions to store materials and products to protect finishes and not permit dust and dirt to penetrate equipment.

B. Replace all equipment damaged beyond reasonable repair as required by Architect.

C. Refinish any equipment with marks, stains, scratches, dents, etc., as required by Architect.

1.7 COORDINATION OF WORK

A. New Construction
1. Openings, Chases, Recesses, Sleeves, Lintels and Bucks (required for admission of Electric Work Prime Contract systems and components): Coordinate requirements with General Work Prime Contractor for inclusion in General Work Prime Contract. Furnish all necessary information (e.g. locations and sizes) to General Work Prime Contractor in

ample time for installation of systems and components included in Electric Work Prime Contract.
2. Locate settings, check locations as installation in General Work Prime Contract progresses, and provide templates or holding fixtures as required to maintain proper accuracy.

B. Existing Construction: Unless otherwise specified, employ General Work Prime Contractor for all cutting, patching, repairing and replacing of general work required for installation of systems and components included in Electric Work Prime Contract. Secure approval before cutting.
1. Rough Openings in Roofs: Refer to Section 01 70 00 - Execution and Closeout Requirements.

1.8 ALTERATION PROCEDURES

A. In locations where existing non-TCLP compliant fluorescent lamps are to be removed, all removals and disposal shall be in strict accordance with Section 01 35 17 - Alteration Project Procedures, and Section 01 74 19 - Construction Waste Management and Disposal; Landfill diversion proposals; Waste Disposal Reports shall be done as part of Electrical Work Prime Contract.

B. In locations where existing devices are indicated to be disconnected and removed and existing circuit is not scheduled to be reused:
1. Remove circuit conductors back to source.
2. Modify panel directory for that circuit.
3. Remove all existing exposed and accessible conduit
4. Provide blank cover plate over existing recessed junction boxes or back boxes. Paint cover plates in finished areas to match existing room finish.
5. Patch and paint existing walls where disturbed by the electrical demolition. Refer to Section 01 35 17 - Alteration Project Procedures for additional requirements for patching and painting.

C. In locations where existing devices are to remain in place, ensure circuits feeding such devices remain operational. Modify existing circuits as required to allow new construction to occur and to maintain all necessary circuitry to existing devices.

D. In locations where entire existing system is being removed or modified:
1. Refer to individual system specification sections for Documentation and Testing Requirements prior to any alteration work on any system.
2. Take all necessary measures to ensure that down time will not compromise safety
3. Notify Owner, Architect and all other Prime Contractors not less than 2 weeks prior to interruptions in service.
4. Coordinate work schedule to minimize duration of system outage during hours when building is occupied.
5. Refer to Section 01 30 00 - Administrative Requirements for additional information and requirements.

1.9 SUBMITTALS

A. Comply with requirements of Section 01 30 00 - Submittal Procedures and as modified below. Refer to submittal listing in each section for specific items required.

B. Factory-Finished Surfaces: On all submittals, indicate standard factory color. Where more than one color is available, selection made by Architect from manufacturer's full range of colors.

C. Contract Closeout Submittals: Comply with requirements of Section 01 78 00, including submission of operating and maintenance instructions as item in "Electric Work Instructions" manual described in that section.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Furnish and install all sleeves, inserts, panels, raceways, boxes, etc., ahead of general construction work and maintain Contractor personnel at Site during installation of general construction work to be responsible for and to maintain these items in position.

B. Unless otherwise noted elsewhere in Contract Documents, bear expense of all cutting, patching, repairing or replacing of work of other trades made necessary by any fault, error or tardiness on part of Electrical Work Prime Contract or damage done by Electric Work Prime Contract. Employ and pay Prime Contractor whose work is involved. .

C. Do not cut waterproofed floors or walls for admission of any equipment or materials and do not pierce any structural members without written permission.

3.2 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

A. Thoroughly demonstrate and instruct Owner's designated representative in care and operation of all electrical systems and equipment furnished and installed in Electric Work Prime Contract.

B. System Operator: Maintain competent operator at building for at least 2 days in 2 consecutive weeks after Owner takes occupancy of major parts of building to operate systems and equipment in presence of Owner's representative.

C. Factory Representative: In addition to demonstration and instruction specified above, provide technically qualified factory representatives from manufacturers of major equipment, to train Owner's representatives in care and operation of applicable products as specified in applicable technical sections of Division 26.

D. Coordinate and schedule time and place of all training through the Architect at the Owner’s convenience.

E. Submit letters attesting to satisfactory completion of all instructions, including date of completion of instruction, names of persons in attendance and signature of Owner’s authorized representative

F. Architect's representative must be present when Owner's representatives participate in instruction.

G. The following equipment and systems are included:
   1. Fire alarm system

3.3 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment that remain or that are to be reused.

B. Provide full inspection of exposed finishes.

C. Remove burrs, dirt, and construction debris.

D. Repair damaged surfaces including chips, scratches, and abrasions. Damp Rag clean all electrical equipment, panels, boxes, and accessories.

END OF SECTION

SECTION 26 05 05
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical demolition.

1.2 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Demolition drawings are based on casual field observation and existing record documents.

C. Report discrepancies to Architect before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Disconnect and remove abandoned panelboards and distribution equipment.

F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

H. Repair adjacent construction and finishes damaged during demolition and extension work.

I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.4 CLEANING AND REPAIR

A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

B. Clean and repair existing materials and equipment that remain or that are to be reused.

C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION

SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single conductor building wire.

B. Metal-clad cable.

C. Wire and cable for 600 volts and less.

D. Wiring connectors.

E. Electrical tape.

F. Heat shrink tubing.

G. Oxide inhibiting compound.

H. Wire pulling lubricant.

I. Cable ties.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 26 05 05 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.

C. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).

C. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).

D. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

E. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

F. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.

G. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.

H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

I. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.

J. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.

K. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

M. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

N. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

O. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

P. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

Q. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

R. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

S. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

C. Manufactured Wiring System Shop Drawings: Provide plan views indicating proposed system layout with components identified; indicate branch circuit connections.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.6 QUALITY ASSURANCE

A. Comply with all requirements of the Energy Conservation Construction Code in the State of New York, including but not limited to US Department of Energy, IECC 2018, and ASHRAE 90.1, including all updates, revisions and amendments.

B. Comply with requirements of NFPA 70.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Concealed Dry Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway or metal clad cable.

E. Exposed Dry Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.

F. Above Accessible Ceilings: Use only building wire with Type THHN/THWN insulation in raceway or metal clad cable.

G. Wet or Damp Interior Locations: Use only building wire with Type THHN/THWN insulation in raceway.

H. Exterior Locations: Use only building wire with Type THHN/THWN insulation in raceway.

I. Underground Installations: Use only building wire with Type THHN/THWN insulation in raceway.

J. Use solid conductors for all 12 AWG circuits. Use stranded conductors only for 10 AWG and larger.

K. Use conductor not smaller than 16 AWG for control circuits.

L. Use 10 AWG stranded conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.

M. Use 10 AWG stranded conductors for 20 ampere, 277 volt branch circuits longer than 150 feet.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.

I. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

J. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
         3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.

K. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

L. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
      a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
   3. Color Code:
      a. 480Y/277 V, 3 Phase, 4 Wire System:
         1) Phase A: Brown.
         2) Phase B: Orange.
         3) Phase C: Yellow.
         4) Neutral/Grounded: Gray.
      b. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      c. 240/120 V, 1 Phase, 3 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Neutral/Grounded: White.

d. Equipment Ground, All Systems: Green.

2.3 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
   1. Copper Building Wire:
      a. Cerro Wire LLC: www.cerrowire.com/#sle.
      b. Encore Wire Corporation: www.encorewire.com/#sle.
      c. General Cable Technologies Corporation: www.generalcable.com/#sle.
      d. Industrial Wire & Cable, Inc: www.iewc.com.
      e. Southwire Company: www.southwire.com/#sle.
      f. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: Single conductor insulated wire.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
   1. Copper Building Wire: Type THHN/THWN.

2.4 METAL-CLAD CABLE

A. Manufacturers:
   1. AFC Cable Systems Inc: www.afcweb.com/#sle.
   2. Encore Wire Corporation: www.encorewire.com/#sle.
   3. Southwire Company: www.southwire.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

C. Insulation Voltage Rating: 600 V.

D. Insulation: Type THHN or THHN/THWN.

E. Provide dedicated neutral conductor for each phase conductor.

F. Grounding: Full-size integral equipment grounding conductor.

G. Armor: Steel, interlocked tape.

H. Provide PVC jacket applied over cable armor for exterior installations, or where indicated or required for environment of installed location.

2.5 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.

C. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
   2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors; split bolt type.
      a. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

D. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

E. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Copper Conductors 6 AWG and larger: Use mechanical connectors where connectors are required.
   4. Stranded Conductors: Use crimped terminals for connections to terminal screws.

F. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

G. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

H. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      b. Ideal Industries, Inc: www.idealindustries.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

I. Mechanical Connectors: Provide bolted type or set-screw type.
   1. Manufacturers:
      a. Burndy LLC: www.burndy.com/#sle.
      b. Thomas & Betts Corporation: www.tnb.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

J. Compression Connectors: Provide circumferential type crimp configuration.
   1. Manufacturers:
      a. Burndy LLC: www.burndy.com/#sle.
      b. Thomas & Betts Corporation: www.tnb.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

K. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
   1. Manufacturers:
      a. Burndy LLC: www.burndy.com/#sle.
      b. Thomas & Betts Corporation: www.tnb.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 ACCESSORIES

A. Electrical Tape:
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
   3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
   4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.

5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
1. Manufacturers:
a. 3M: www.3m.com/#sle.
b. Thomas & Betts Corporation: www.tnb.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
1. Manufacturers:
a. Burndy LLC: www.burndy.com/#sle.
b. Ideal Industries, Inc: www.idealindustries.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
1. Manufacturers:
a. 3M: www.3m.com/#sle.
b. Ideal Industries, Inc: www.idealindustries.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.

E. Cable Ties: Material and tensile strength rating suitable for application.
1. Manufacturers:
a. Burndy LLC: www.burndy.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

A. Circuiting Requirements:
1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated without specific routing, determine exact routing required.

3. Include circuit lengths required to install connected devices within 10 ft of location indicated.
4. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
5. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
   a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
   b. Increase size of conductors as required to account for ampacity derating.
   c. Size raceways, boxes, etc. to accommodate conductors.
6. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
7. Provide oversized neutral/grounded conductors where indicated and as specified below.
   a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.
   b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Install metal-clad cable (Type MC) in accordance with NECA 120.

E. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Exposed Cable Installation (only where specifically permitted):
1. Route cables parallel or perpendicular to building structural members and surfaces.
2. Protect cables from physical damage.

G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

H. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

I. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
   a. Use listed fittings.
   b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

J. Install conductors with a minimum of 12 inches of slack at each outlet.

K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

M. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
   5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Dry Locations: Use electrical tape.
      a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
   2. Damp Locations: Use insulating covers specifically designed for the connectors.
      a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
   3. Wet Locations: Use heat shrink tubing.

O. Insulate ends of spare conductors using vinyl insulating electrical tape.

P. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

Q. Identify conductors and cables in accordance with Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.

R. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

S. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is only required for services and feeders. The resistance test for parallel conductors listed as optional is not required.

D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

1.2 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify exact locations of underground metal water service pipe entrances to building.
   2. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

C. Project Record Documents: Record actual locations of grounding electrode system components and connections.

D. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
   4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
   5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
   6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
   7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
      a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
      b. Metal gas piping.
   8. Provide bonding for interior metal air ducts.
   9. Provide bonding for metal building frame.
   10. Provide bonding for metal siding not effectively bonded through attachment to metal building frame.
   11. Provide bonding and equipment grounding for pools and fountains and associated equipment in accordance with NFPA 70.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.
         2) Use bare copper conductors where directly encased in concrete (not in raceway).
   2. Wire: Stranded Copper.

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
   3. Unless otherwise indicated, use bronze mechanical connectors for accessible connections.
      a. Exceptions:
         1) Use exothermic welded connections for connections to metal building frame.
   4. Manufacturers - Mechanical and Compression Connectors:
      a. Burndy LLC: www.burndy.com/#sle.
      b. Copperweld: www.copperweld.com.
      c. Erico International: www.erico.com.
      d. O-Z Gedney: www.emerson.com.
      e. Thomas & Betts Corporation: www.tnb.com/#sle.
      f. Substitutions: See Section 01 60 00 - Product Requirements.
   5. Manufacturers - Exothermic Welded Connections:
      a. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.
      b. Copperweld: www.copperweld.com.
      c. O-Z Gedney: www.emerson.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.

1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

A. Section 26 05 33.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.

B. Section 26 05 33.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

C. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.3 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.

D. MFMA-4 - Metal Framing Standards Publication; 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

C. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC (ICC-ES), provide current ICC-ES evaluation reports upon request.

D. Installer's Qualification Statement: Include evidence of compliance with specified requirements.

E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Comply with the following. Where requirements differ, comply with most stringent.
      a. NFPA 70.
      b. Requirements of authorities having jurisdiction.
   2. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
   5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   7. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.

b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel or approved equivalent unless otherwise indicated.
c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
b. Erico International Corporation: www.erico.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
1. Manufacturers:
a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
b. Erico International Corporation: www.erico.com/#sle.
c. Thomas & Betts Corporation: www.tnb.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.
2. Channel Material:
a. Indoor Dry Locations: Use zinc-plated steel.
b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
3. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
4. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
5. Manufacturers:
a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
b. Thomas & Betts Corporation: www.tnb.com/#sle.
c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
a. Equipment Supports: 1/2 inch diameter.
b. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
e. Outlet Boxes: 1/4 inch diameter.
f. Luminaires: 1/4 inch diameter.

F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use expansion anchors or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps or machine bolts.

7. Sheet Metal: Use sheet metal screws.
8. Wood: Use wood screws.
9. Powder-actuated fasteners are permitted only as follows:
   a. Use only threaded studs; do not use pins.
10. Hammer-driven anchors and fasteners are not permitted.
11. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    a. Comply with MFMA-4.
    b. Channel Material: Use galvanized steel.
    c. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.
    d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
12. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
13. Manufacturers - Mechanical Anchors:
    a. Hilti, Inc: www.us.hilti.com/#sle.
    b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.
    c. Powers Fasteners, Inc: www.powers.com/#sle.
    d. Substitutions: See Section 01 60 00 - Product Requirements.
14. Manufacturers - Powder-Actuated Fastening Systems:
    a. Hilti, Inc: www.us.hilti.com/#sle.
    b. ITW Ramset, a division of Illinois Tool Works, Inc: www.ramset.com/#sle.
    c. Powers Fasteners, Inc: www.powers.com/#sle.
    d. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

H. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   a. Minimum standoff: 1 inch.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
5. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
6. Install surface-mounted cabinets and panelboards with minimum of four anchors.
7. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

I. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

J. Secure fasteners according to manufacturer's recommended torque settings.

K. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 26 05 33.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. Flexible metal conduit (FMC).

C. Liquidtight flexible metal conduit (LFMC).

D. Electrical metallic tubing (EMT).

E. Rigid polyvinyl chloride (PVC) conduit.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.

C. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

D. Section 26 05 29 - Hangers and Supports for Electrical Systems.

E. Section 26 05 33.16 - Boxes for Electrical Systems.

F. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.

B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.

E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

F. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2018.

G. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.

H. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2016.

I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

K. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

L. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

M. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

N. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.

O. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

C. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.6 QUALITY ASSURANCE

A. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

B. Work shall be inspected by a local Authority Having Jurisdiction (AHJ). Contractor shall provide certificate of inspection prior to final payment request.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
1. Under Slab on Grade: Use galvanized steel rigid metal conduit.
2. Exterior, Direct-Buried: Use rigid PVC conduit.
3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.

D. Embedded Within Concrete:
1. Within Slab on Grade: Use rigid PVC conduit.
2. Within Slab Above Ground: Use rigid PVC conduit.
3. Within Concrete Walls Above Ground: Use rigid PVC conduit.
4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from concrete.

E. Concealed Within Masonry Walls: Use electrical metallic tubing (EMT).

F. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

G. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

I. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).

J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
1. Locations subject to physical damage include, but are not limited to:
a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

K. Exposed, Exterior: Use galvanized steel rigid metal conduit.

L. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
1. Maximum Length: 6 feet.

M. Connections to Vibrating Equipment:
1. Dry Locations: Use flexible metal conduit.
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
3. Maximum Length: 6 feet unless otherwise indicated.
4. Vibrating equipment includes, but is not limited to:
a. Transformers.
b. Motors.

N. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.2 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.

B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Minimum Conduit Size, Unless Otherwise Indicated:
1. Branch Circuits: 3/4 inch (21 mm) trade size.
2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
3. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
4. Underground, Interior: 3/4 inch (21 mm) trade size.
5. Underground, Exterior: 3/4 inch (21 mm) trade size.

E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:
1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
2. Picoma: www.picoma.com.
3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:
1. Manufacturers:
2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel.
4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.4 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
2. Electri-Flex Company: www.electriflex.com/#sle.
3. International Metal Hose: www.metalhose.com/#sle.

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.

2. Electri-Flex Company: www.electriflex.com/#sle.
3. International Metal Hose: www.metalhose.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:
1. Manufacturers:
a. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
b. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use aluminum.

2.6 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com/#sle.
2. Nucor Tubular Products: www.nucortubular/#sle.
3. Wheatland Tube Company: www.wheatland.com/#sle.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
1. Manufacturers:
a. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
b. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel.
4. Connectors and Couplings: Use set-screw type.
a. Do not use indenter type connectors and couplings.

2.7 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Manufacturers:
1. Cantex Inc: www.cantexinc.com/#sle.
2. JM Eagle: www.jmeagle.com/#sle.
3. Picoma: www.picoma.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 80 unless otherwise indicated; rated for use with conductors rated 90 degrees C, schedule 40 not permitted.

C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.8 ACCESSORIES

A. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

B. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

C. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.

D. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

E. Bore Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for installation within casing; furnished with roller wheels to facilitate installation, openings to facilitate grout flow, and holes for stabilization cable; suitable for the casing and conduit/duct arrangement to be installed.
   1. Products:
      a. Advance Products & Systems, LLC; Bore Spacers: www.apsonline.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Where conduit is installed on an existing wall, paint conduit to match the wall finish.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

E. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

F. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.
   5. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
   6. Arrange conduit to maintain adequate headroom, clearances, and access.
   7. Arrange conduit to provide no more than the equivalent of three 90 degree bends between pull points.
   8. Route conduits above water and drain piping where possible.
   9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
   10. Maintain minimum clearance of 6 inches between conduits and piping for other systems.

11. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
    a. Heaters.
    b. Hot water piping.
    c. Flues.
12. Group parallel conduits in the same area together on a common rack.

G. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
    a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use of spring steel conduit clips for support of conduits is not permitted.
9. Use of wire for support of conduits is not permitted.

H. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

I. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

J. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
   1. Secure conduits to prevent floating or movement during pouring of concrete.

K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
   3. Where conduits are subject to earth movement by settlement or frost.

L. Conduit Sealing:
   1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
      a. Where conduits enter building from outside.
      b. Where service conduits enter building from underground distribution system.
      c. Where conduits enter building from underground.
      d. Where conduits may transport moisture to contact live parts.
   2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
      a. Where conduits pass from outdoors into conditioned interior spaces.
      b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
   3. Where conduits penetrate coolers or freezers.

N. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

O. Provide grounding and bonding in accordance with Section 26 05 26.

P. Identify conduits in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 05 33.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Boxes and enclosures for integrated power, data, and audio/video.

C. Floor boxes.

D. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Section 26 05 29 - Hangers and Supports for Electrical Systems.

D. Section 26 05 33.13 - Conduit for Electrical Systems:
   1. Conduit bodies and other fittings.
   2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.

E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

F. Section 26 27 26 - Wiring Devices:
   1. Wall plates.
   2. Floor box service fittings.
   3. Additional requirements for locating boxes for wiring devices.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for outlet and device boxes, junction and pull boxes, floor boxes, and underground boxes/enclosures.

C. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. Keys for Lockable Enclosures: Two of each different key.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 BOXES

A. General Requirements:
1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled as suitable for the purpose intended.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
4. Use suitable concrete type boxes where flush-mounted in concrete.
5. Use suitable masonry type boxes where flush-mounted in masonry walls.
6. Use raised covers suitable for the type of wall construction and device configuration where required.
7. Use shallow boxes where required by the type of wall construction.
8. Do not use "through-wall" boxes designed for access from both sides of wall.
9. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
10. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
11. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
13. Wall Plates: Comply with Section 26 27 26.
14. Manufacturers:
    a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
    b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
    c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
    d. Thomas & Betts Corporation: www.tnb.com/#sle.
    e. Substitutions: See Section 01 60 00 - Product Requirements.

C. Floor Boxes:
1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 27 26; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
2. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
3. Manufacturer: Refer to floor box schedule on drawings for additional information.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:
   1. Unless dimensioned, box locations indicated are approximate.
   2. Locate boxes as required for devices installed under other sections or by others.
      a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26.
   3. Locate boxes so that wall plates do not span different building finishes.
   4. Locate boxes so that wall plates do not cross masonry joints.
   5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
   6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
   7. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
   8. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
      a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
      b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
   9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 05 33.13.
   10. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
      a. Concealed above accessible suspended ceilings.
      b. Within joists in areas with no ceiling.
      c. Electrical rooms.
      d. Mechanical equipment rooms.

I. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
   4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

L. Install boxes as required to preserve insulation integrity.

M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

O. Close unused box openings.

P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

Q. Provide grounding and bonding in accordance with Section 26 05 26.

R. Identify boxes in accordance with Section 26 05 53.

3.3 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Underground warning tape.

1.2 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

B. Section 26 27 26 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.

1.3 REFERENCE STANDARDS

A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:
   1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
   2. Do not install identification products until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.7 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
   2. In addition to identifying data specific to individual pieces of equipment listed, each equipment identification namplate or label shall include a date of installation in a MM/YYYY format.
      a. Switchgear:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Use identification nameplate to identify load(s) served for each branch device. Identify spares and spaces.
      b. Switchboards:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Use identification nameplate to identify load(s) served for each branch device. Identify spares and spaces.
      c. Panelboards:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Identify power source and circuit number. Include location.
         4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
         5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces.
         6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
      d. Transformers:
         1) Identify kVA rating.
         2) Identify voltage and phase for primary and secondary.
         3) Identify power source and circuit number. Include location.
         4) Identify load(s) served. Include location.
      e. Enclosed switches, circuit breakers, and motor controllers:
         1) Identify voltage and phase.
         2) Identify power source and circuit number. Include location when not within sight of equipment.
         3) Identify load(s) served. Include location.
   3. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.
      a. Service equipment.

B. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
2. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
   a. At each source and load connection.
   b. Within boxes when more than one circuit is present.
   c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
   d. In cable tray, at maximum intervals of 20 feet.
3. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.
4. Use underground warning tape to identify direct buried cables.

C. Identification for Devices:
1. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.
2. Use identification label to identify fire alarm system devices.
3. Use identification label to identify serving branch circuit for all receptacles.

D. Identification for Luminaires:
1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Manufacturers:
   a. Brimar Industries, Inc: www.brimar.com/#sle.
   b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
   c. Seton Identification Products: www.seton.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.
2. Materials: Conform to ASTM D709
   a. Indoor Clean, Dry Locations: Use plastic nameplates.
   b. Outdoor Locations: Use plastic nameplates suitable for exterior use.
3. Plastic Nameplates: Three-layer laminated acrylic with beveled edges; minimum thickness of 1/8 inch; engraved text.
   a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
   b. Color: Black letters on white background.
4. Letter Size: Use 1/4 inch letters for identifying grouped equipment and loads.
5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Manufacturers:
   a. Brady Corporation: www.bradyid.com/#sle.
   b. Brother International Corporation: www.brother-usa.com/#sle.
   c. Panduit Corp: www.panduit.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
   a. Use 3/16 inch black letters on clear background. Use only for identification of individual wall switches and receptacles, control device stations

2.3 WIRE AND CABLE MARKERS

A. Manufacturers:

1. Brady Corporation: www.bradyid.com/#sle.
2. Seton Identification Products: www.seton.com.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

2.4 UNDERGROUND WARNING TAPE

A. Manufacturers:
1. Brady Corporation: www.bradyid.com/#sle.
2. Seton Identification Products: www.seton.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Materials: Use foil-backed detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

C. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.

D. Legend: Type of service, continuously repeated over full length of tape.

E. Color:
1. Tape for Buried Power Lines: Black text on yellow background.
2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean and degrease surfaces to receive adhesive products according to manufacturer's instructions.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
1. Surface-Mounted Equipment: Enclosure front.
2. Flush-Mounted Equipment: Inside of equipment door.
3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
4. Elevated Equipment: Legible from the floor or working platform.
5. Branch Devices: Adjacent to device.
6. Interior Components: Legible from the point of access.
7. Conductors and Cables: Legible from the point of access.

8. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 6 inch(es) below finished grade.
   1. At paved areas, install 3 inches below pavement section.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

SECTION 26 05 83
WIRING CONNECTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical connections to equipment.

1.2 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.

B. Section 26 05 33.13 - Conduit for Electrical Systems.

C. Section 26 05 33.16 - Boxes for Electrical Systems.

D. Section 26 27 26 - Wiring Devices.

E. Section 26 28 16.16 - Enclosed Switches.

1.3 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).

B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
   2. Determine connection locations and requirements.

B. Sequencing:
   1. Install rough-in of electrical connections before installation of equipment is required.
   2. Make electrical connections before required start-up of equipment.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
   1. Colors: Comply with NEMA WD 1.
   2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
   3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

B. Disconnect Switches: As specified in Section 26 28 16.16 and in individual equipment sections.

C. Wiring Devices: As specified in Section 26 27 26.

D. Flexible Conduit: As specified in Section 26 05 33.13.

E. Wire and Cable: As specified in Section 26 05 19.

F. Boxes: As specified in Section 26 05 33.16.

2.2 EQUIPMENT CONNECTIONS

A. Refer to connection schedule on the drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION 26 05 83

SECTION 26 09 23
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vacancy sensors.

B. Daylighting controls.

1.2 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 05 33.16 - Boxes for Electrical Systems.

D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. 47 CFR 15 - Radio Frequency Devices; current edition.

B. ANSI C136.24 - American National Standard for Roadway and Area Lighting Equipment - Nonlocking (Button) Type Photocontrols; 2004 (R2010).

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of wall switch vacancy sensors with actual installed door swings.
   2. Coordinate the placement of vacancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
   3. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
   4. Notify Architect/Engineerof any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
   1. Do not install lighting control devices until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
   1. Vacancy Sensors: Include detailed motion detection coverage range diagrams.

C. Operation and Maintenance Data: Include detailed information on device programming and setup.

D. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.2 VACANCY SENSORS

A. Manufacturers:
   1. Hubbell Incorporated: www.hubbell.com/#sle.
   2. Lutron Electronics Company, Inc: www.lutron.com/#sle.
   3. Substitutions: See Section 01 60 00 - Product Requirements.
   4. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

B. All Vacancy Sensors:
   1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small

desktop level movements, according to published coverage areas, for automatic control of load indicated.
2. Sensor Technology:
   a. Passive Infrared/Ultrasonic Dual Technology Vacancy Sensors: Designed to detect vacancy using a combination of both passive infrared and ultrasonic technologies.
3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
4. Operation: Unless otherwise indicated, load to be manual on and automatic off when no occupant presence is detected during an adjustable turn-off delay time interval.
5. Dual Technology Vacancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
7. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
8. Sensitivity: Field adjustable.
9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
10. Load Rating for Line Voltage Vacancy Sensors: As required to control the load indicated on drawings.
11. Provide with auxilary relay: SPDT dry contacts.

C. Wall Switch Vacancy Sensors:
   1. All Wall Switch Vacancy Sensors:
      a. Description: Vacancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
      b. Unless otherwise indicated or required to control the load indicated on drawings, provide line voltage units with self-contained relay.
      c. Operation: Operates only as vacancy sensor (manual-on/automatic-off) in accordance with California Title 24 requirements.
      d. Finish: Match finishes specified for wiring devices in Section 26 27 26, unless otherwise indicated. Cover plate shall be stainless steel to match other wiring devices.
      e. Provide with auxilary relay: SPDT dry contact
   2. Passive Infrared/Ultrasonic Dual Technology Wall Switch Vacancy Sensors: Capable of detecting motion within an area of 900 square feet.

D. Ceiling Mounted Vacancy Sensors:
   1. All Ceiling Mounted Vacancy Sensors:
      a. Description: Low profile vacancy sensors designed for ceiling installation.
      b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
      c. Finish: White unless otherwise indicated.
      d. Provide with auxilary relay: SPDT dry contact
   2. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Vacancy Sensors:
      a. Standard Range Sensors: Capable of detecting motion within an area of 1000 at a mounting height of 9 feet, with a field of view of 360 degrees.
         1) Products:
            (a) Hubbell NXOS series.
            (b) Substitutions: See Section 01 60 00 - Product Requirements.

E. Power Packs for Low Voltage Vacancy Sensors:
   1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage vacancy sensors for switching of line voltage loads.
   2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.

3. Input Supply Voltage: Dual rated for 120/277 V ac.
4. Load Rating: As required to control the load indicated on drawings.

2.3 DAYLIGHTING CONTROLS

A. Manufacturers:
   1. Hubbell Building Automation, Inc: www.hubbellautomation.com
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. System Description: Control system consisting of photo sensors and compatible control modules and power packs, contactors, or relays as required for automatic control of load indicated according to available natural light; capable of integrating with vacancy sensors and manual override controls.

C. Daylighting Control Photo Sensors: Low voltage class 2 photo sensor units with output signal proportional to the measured light level and provision for zero or offset based signal.
   1. Sensor Type: Filtered silicon photo diode.
   2. Sensor Range:
      a. Indoor Photo Sensors: 5 to 100 footcandles.
      b. Outdoor Photo Sensors: 5 to 250 footcandles.
      c. Atrium Photo Sensors: 200 to 2,500 footcandles.
      d. Skylight Photo Sensors: 1,000 to 6,000 footcandles.
      e. Open Loop Photo Sensors: 3 to 6,000 footcandles.
   3. Finish: White unless otherwise indicated.
   4. Where wired sensors are indicated, wireless sensors are acceptable provided that all components and wiring modifications necessary for proper operation are included.
   5. Wireless Daylighting Control Photo Sensors:
      a. RF Range: 30 feet through typical construction materials.
      b. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of 47 CFR 15, for Class B application.
      c. Power: Battery-operated with minimum ten-year battery life.

D. Daylighting Control Dimming Modules for Low Voltage Sensors: Low voltage class 2 control unit compatible with specified photo sensors and with specified dimming ballasts, for both continuous dimming of compatible dimming ballasts and switching of compatible power packs, contactors, or relays in response to changes in measured light levels according to selected settings.
   1. Operation: Unless otherwise indicated, specified load to be continuously brightened as not enough daylight becomes available and continuously dimmed as enough daylight becomes available.
   2. Control Capability: Capable of controlling up to three separately programmable channels, with up to 50 ballasts per channel.
   3. Dimming and Fade Rates: Adjustable from 5 to 60 seconds.
   4. Cut-Off Delay: Selectable and adjustable from 0 to 20 minutes.

E. Power Packs for Low Voltage Daylighting Control Modules:
   1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage daylighting control modules for switching of line voltage loads. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
   2. Input Supply Voltage: Dual rated for 120/277 V ac.
   3. Load Ratings: As required to control the load indicated on drawings.

F. Accessories:
   1. Where indicated, provide compatible accessory wall switches for manual override control.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of lighting control devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
      a. Wall Switch Vacancy Sensors: 48 inches above finished floor.
   2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
   3. Locate wall switch vacancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Provide required supports in accordance with Section 26 05 29.

G. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

H. Identify lighting control devices in accordance with Section 26 05 53.

I. Vacancy Sensor Locations:
   1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.
   2. Locate ultrasonic and dual technology passive infrared/ultrasonic vacancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

J. Daylighting Control Photo Sensor Locations:
   1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for proper control of respective room or area based on manufacturer's recommendations for installed devices.
   2. Unless otherwise indicated, locate photo sensors for closed loop systems to accurately measure the light level controlled at the designated task location, while minimizing the measured amount of direct light from natural or artificial sources such as windows or pendant luminaires.
   3. Unless otherwise indicated, locate photo sensors for open loop systems to accurately measure the level of daylight coming into the space, while minimizing the measured amount of lighting from artificial sources.

K. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

L. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

M. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each lighting control device for damage and defects.

C. Test vacancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area.

D. Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable. Record test results in written report to be included with submittals.

E. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust vacancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

C. Adjust position of directional vacancy sensors and outdoor motion sensors to achieve optimal coverage as required.

D. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology vacancy sensor lenses to block undesired motion detection.

E. Adjust daylighting controls under optimum lighting conditions after all room finishes, furniture, and window treatments have been installed to achieve desired operation as indicated or as directed by Architect. Record settings in written report to be included with submittals. Readjust controls calibrated prior to installation of final room finishes, furniture, and window treatments that do not function properly as determined by Architect.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of lighting control devices to Architect, and correct deficiencies or make adjustments as directed.

D. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.
   3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.
   4. Location: At project site.

END OF SECTION

SECTION 26 24 16
PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Lighting and appliance panelboards.

B. Overcurrent protective devices for panelboards.

1.2 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e (Amended 2017).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.

E. NEMA PB 1 - Panelboards; 2011.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.

G. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 67 - Panelboards; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

M. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

N. UL 1699 - Arc-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

C. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

D. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Panelboard Keys: Two of each different key.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

B. Siemens Industry, Inc: www.usa.siemens.com/#sle.

C. Substitutions: See Section 01 60 00 - Product Requirements.

D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

C. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

D. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

E. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
   2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

F. Conductor Terminations: Suitable for use with the conductors to be installed.

G. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
   2. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.
   3. Fronts:
      a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
      b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
      c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.
   4. Lockable Doors: All locks keyed alike unless otherwise indicated.

H. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.3 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
   1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.
a. Provide insulated ground bus where indicated.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:
1. Provide surface-mounted or flush-mounted enclosures as indicated.
2. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide metal circuit directory holder mounted on inside of door.

2.4 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
2) 14,000 rms symmetrical amperes at 480 VAC.
b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
3. Conductor Terminations:
a. Provide mechanical lugs unless otherwise indicated.
b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
a. Provide the following field-adjustable trip response settings:
1) Long time pickup, adjustable by setting dial.
2) Long time delay.
3) Short time pickup and delay.
4) Ground fault pickup and delay where ground fault protection is indicated.
6. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
7. Provide the following circuit breaker types where indicated:
a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
b. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
8. Provide type HACR for air conditioning equipment circuits.
9. Do not use tandem circuit breakers.
10. Provide the following features and accessories where indicated or where required to complete installation:
a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.

b. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.

2.5 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required support and attachment in accordance with Section 26 05 29.

F. Install panelboards plumb.

G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling.

J. Provide grounding and bonding in accordance with Section 26 05 26.

K. Install all field-installed branch devices, components, and accessories.

L. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.

M. Provide filler plates to cover unused spaces in panelboards.

N. Identify panelboards in accordance with Section 26 05 53.

O. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Perform field inspection and testing in accordance with Section 01 40 00.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

E. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers. Tests listed as optional are not required.

F. Test GFCI circuit breakers to verify proper operation.

G. Test AFCI circuit breakers to verify proper operation.

H. Test shunt trips to verify proper operation.

I. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.5 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Wall dimmers.

C. Receptacles.

D. Wall plates.

1.2 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 33.16 - Boxes for Electrical Systems.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.

1.3 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2017h.

B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); 2017g.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).

F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

L. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

D. Provide GFCI protection for receptacles installed within 6 feet of sinks.

E. Provide GFCI protection for receptacles installed in kitchens.

F. Provide GFCI protection for receptacles serving electric drinking fountains.

2.2 WIRING DEVICE FINISHES

A. Provide wiring device finishes as described below unless otherwise indicated.

B. Wiring Devices, Unless Otherwise Indicated: color selection by architect with stainless steel wall plate.

2.3 WALL SWITCHES

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell.com/#sle.
2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.4 WALL DIMMERS

A. Manufacturers:
   1. Leviton Manufacturing Company, Inc; IP710-LFZ series: www.leviton.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Wall Dimmers - General Requirements: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.

C. Control: Slide control type with separate on/off switch.

D. Power Rating, Unless Otherwise Indicated or Required to Control the Load Indicated on the Drawings:
   1. LED: 1200 VA.

2.5 RECEPTACLES

A. Manufacturers:
   1. Hubbell Incorporated: www.hubbell.com/#sle.
   2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
   3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
   4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
   2. NEMA configurations specified are according to NEMA WD 6.

C. Convenience Receptacles:
   1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
   2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.

D. GFCI Receptacles:
   1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.

a. Provide test and reset buttons of same color as device.

2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

E. USB Charging Devices:
1. USB Charging / Receptacle Combination Devices: Two-port (1 type A and 1 type C) USB 3.1 charging device and receptacle, commercial specification grade, duplex, 20A, 125V, NEMA 5-20R; rectangular decorator style.

2.6 WALL PLATES

A. Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Size: Standard.
3. Screws: Metal with slotted heads finished to match wall plate finish.

B. Basis of Design: Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
1. Material type and color to be selected and approved by Owner and Architect.

C. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed. Hubbell #WP8M or approved equal.

D. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type. Hubbell #WP26M or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of wiring devices provided under this section.
   1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   2. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
   3. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
   4. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.

F. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

G. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

H. Install wiring devices plumb and level with mounting yoke held rigidly in place.

I. Install wall switches with OFF position down.

J. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

K. Do not share neutral conductor on branch circuits utilizing wall dimmers.

L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

O. Identify wiring devices in accordance with Section 26 05 53.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each wiring device for damage and defects.

C. Operate each wall switch with circuit energized to verify proper operation.

D. Test each receptacle to verify operation and proper polarity.

E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust presets for wall dimmers according to manufacturer's instructions as directed by Architect.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 26 28 13
FUSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fuses.

1.2 RELATED REQUIREMENTS

A. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

B. Section 26 24 16 - Panelboards: Fusible switches.

1.3 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
   2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
   3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com/#sle.

B. Littelfuse, Inc: www.littelfuse.com/#sle.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION 26 28 13

SECTION 26 28 16.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Enclosed safety switches.

1.2 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 28 13 - Fuses.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.

C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.

D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
   4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.8 FIELD CONDITIONS

A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation; Cutler Hammer: www.eaton.com/#sle.

B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

C. Siemens Industry, Inc: www.usa.siemens.com/#sle.

D. Substitutions: See Section 01 60 00 - Product Requirements.

E. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.

2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

D. Horsepower Rating: Suitable for connected load.

E. Voltage Rating: Suitable for circuit voltage.

F. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

G. Provide with switch blade contact position that is visible when the cover is open.

H. Fuse Clips for Fusible Switches: As required to accept fuses indicated.

I. Conductor Terminations: Suitable for use with the conductors to be installed.

J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
   a. Indoor Clean, Dry Locations: Type 1.
   b. Outdoor Locations: Type 3R.
2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

M. Heavy Duty Switches:
1. Comply with NEMA KS 1.
2. Conductor Terminations:
   a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section 26 05 29.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 05 26.

H. Provide fuses complying with Section 26 28 13 for fusible switches as indicated or as required by equipment manufacturer's recommendations.

I. Identify enclosed switches in accordance with Section 26 05 53.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

D. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

B. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems.

B. Section 26 05 33.16 - Boxes for Electrical Systems.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 27 26 - Wiring Devices: Manual wall switches and wall dimmers.

1.3 REFERENCE STANDARDS

A. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.

B. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.

C. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
   2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
   3. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

E. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Recessed Luminaires:
   1. Ceiling Compatibility: Comply with NEMA LE 4.
   2. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.

2.3 ACCESSORIES

A. Chain hang pendant luminaires in utilitarian spaces.

B. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

D. Provide required support and attachment in accordance with Section 26 05 29.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Suspended Ceiling Mounted Luminaires:
   1. Do not use ceiling tiles to bear weight of luminaires.
   2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
   3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
   4. Secure pendant-mounted luminaires to building structure.
   5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.

6. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gauge, connected from opposing corners of each recessed luminaire to building structure.
7. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

G. Recessed Luminaires:
1. Install trims tight to mounting surface with no visible light leakage.
2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.

H. Suspended Luminaires:
1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
3. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet between supports.
4. Install canopies tight to mounting surface.

I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

J. Install accessories furnished with each luminaire.

K. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.

3.6 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Just prior to Substantial Completion, replace all lamps that have failed.

3.8 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

3.9 ATTACHMENTS

A. Luminaire schedule located on contract drawings.

END OF SECTION

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior luminaires.

1.2 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 05 33.16 - Boxes for Electrical Systems.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2006.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
   2. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires in accordance with NECA/IESNA 501.

D. Provide required support and attachment in accordance with Section 26 05 29.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Pole-Mounted Luminaires:
   1. Grounding:
      a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
   2. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

3.6 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

3.8 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 27 05 26
GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding Busbars.

B. Telecommunications Equipment Bonding Conductors.

C. Beam Grounding Clamps.

D. Bonding Hardware.

E. Lightning Protection.

F. Wire.

G. Mechanical connectors.

1.2 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 27 05 28 - Pathways For Communications Systems.

C. Section 27 05 53 - Identification For Communications Systems.

D. Section 27 10 05 - Communications Copper Cabling.

E. Section 27 11 16 - Communications Cabinets, Racks, Enclosures, & Accessories.

F. Section 27 15 23 - Communications Optical Fiber Cabling.

1.3 REFERENCE STANDARDS

A. BICSI TDMM - Telecommunications Distribution Methods Manual, 13th Edition; 2014.

B. NECA/BICSI 607 - Standard for Telecommunications Bonding and Grounding Planning and Installation Methods forCommercial Buildings; 2011.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d.

E. UL 1581 - Reference Standard for Electrical Wires, Cables, and Flexible Cords; Current Edition, Including All Revisions.

F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, For submittal procedures.

B. Product Data: Submit product data on grounding and bonding equipment and connections.

C. Test Reports: Indicate overall resistance to earth ground.

D. Manufacturer's Installation Instructions: Submit for active electrodes.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.6 QUALITY ASSURANCE

A. Provide grounding, surge protection and lightning protection of telecommunications system in accordance with latest version of Grounding, Bonding and Electrical Protection chapter of the BICSI TDMM Manual, TIA-607, and NFPA 70.
   1. Maintain one copy of each document on site.

B. Assure that the "as installed" system is correctly and completely documented including engineering drawings, manuals, and operational procedures in such a manner as to support maintenance and future expansion of the system.

C. Cables and cable assemblies shall be VW-1 flame rated and comply with UL 1581 and CSA Certified.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction, such as UL.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing work of this section with minimum five years documented experience.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements, for transporting, handling, storing, and protecting products.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.10 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

A. Panduit: www.panduit.com.

B. Or Approved Equal.

C. Substitutions: See Section 01 60 00 - Product Requirements, for substitution procedures.

2.2 SYSTEM DESCRIPTION

A. The purpose of this grounding system is to create a low impedance path to earth ground for electrical surges and transient voltages. Lightning, fault currents, circuit switching (motors turning on and off), and electrostatic discharge (ESD) are common causes of these surges and transient voltages. An effective grounding system minimizes the detrimental effects of these electrical surges, which include degraded network performance and reliability and increased safety risks.

B. The grounding system must be intentional, visually verifiable, adequately sized to handle expected currents safely, and directs these potentially damaging currents away from sensitive network equipment. As such, grounding must be purposeful in its design and installation. The following four issues require special consideration:
   1. Although AC powered equipment typically has a power cord that contains a ground wire, the integrity of this path cannot be easily verified. Thus, many equipment manufacturers require grounding above and beyond that which is specified by local electrical codes, such as the National Electrical Code. Always follow the grounding recommendations of the manufacturer when installing equipment.
   2. While the building steel and metallic water piping must be bonded to the grounding system for safety reasons, neither may be substituted for the telecommunications bonding backbone (TBB).
   3. Electrical continuity throughout each rack or cabinet is required to minimize safety risks. Hardware typically supplied with bolt-together racks is not designed for grounding purposes. Additionally, most racks are painted and paint is an insulator. Unless rack members are deliberately bonded, continuity between members is incidental, and in many cases, unlikely.
   4. Any metallic component that is part of the data center, including equipment, racks, ladder racks, enclosures, cable trays, etc. must be bonded to the grounding system.

C. The communications grounding systems shall use the Building Grounding Electrode as the grounding element.
   1. The following elements shall not be acceptable as grounding electrodes:
      a. Building Plumbing System.
      b. Gas Piping System.
      c. Fire Sprinkler System.

2.3 GENERAL

A. Two-hole lugs shall be used wherever possible to resist loosening when twisted (bumped) or exposed to vibration. All lugs shall be irreversible compression and meet NEBS Level 3 as tested by Telcordia. Lugs with inspection windows shall be used in all non-corrosive environments so that connections may be inspected for full conductor insertion.

B. Die index numbers shall be embossed on all compression connections to allow crimp inspection.

C. Lugs, HTAPs, grounding strips, and busbars shall be UL Listed and made of premium quality tin-plated electrolytic copper that provides low electrical resistance while inhibiting corrosion.

D. Antioxidant shall be used when making bonding connections in the field.

2.4 GROUNDING BUSBARS

A. General:
1. Meeting NECA/BICSI 607 and TIA-607 requirements for network systems bonding applications.
2. Rectangular copper bar, tin-plated to inhibit corrosion.
3. Pre-assembled mounting bracket, fully insulated from busbar.
4. Pre-drilled paired holes to accommodate two hole lugs, quantity as determined by size of busbar required:
   a. 1/4 inch stud holes, 5/8 inch on center.
   b. 3/8 inch stud holes, 1 inch on center.

2.5 GROUNDING AND BONDING WIRE

A. All grounding and bonding conductors shall be insulated stranded copper wire.
1. Jackets shall be VW-1 Flame Rated in accordance with UL 1581.
   a. Color: Distinctive green or green/yellow.

B. The Telecommunications Grounding Busbar (TGB) in each telecommunications space shall be grounded / earthed to the Telecommunications Main Grounding Busbar (TMGB) located at the service entrance. The gauge of the connecting copper ground / earth cable, known as the Telecommunications Bonding Backbone (TBB) shall follow BICSI TDMM Manual and TIA-607 guidelines, as is shown in the table below.

TBB Length in Linear feet	TBB Size (AWG)
Less than 13	6
14 - 20	4
21 - 26	3
27 - 33	2
34 - 41	1
42 - 52	1/0
53 - 66	2/0
Greater than 66	3/0

C. The TMGB will be bonded to building steel and grounded to the electrical service ground according to BICSI TDMM Manual and TIA-607 guidelines. In telecommunications spaces with only one rack, the rack jumper cable shall be connected directly to the TGB. The gauge of connecting copper ground cables shall be sized as shown in the table below.

Equipment / Purpose	Copper Cable Size (AWG)
Bonding conductor to each PDU or panel board serving the room	Size per NEC 250.122 and manufacturer requirements
Conduits, water pipes, and ducts	6
Bonding conductor to HVAC equipment	6
Cable trays / ladder racks	6

Building columns	4
Aisle grounds (over head or under floor) of the common bonding network	1/0

2.6 COMPRESSION LUGS

A. Lugs shall meet NEBS Level 3 requirements as tested by Telcordia.

B. Two hole lugs for connection of grounding wire to busbars, racks, cabinets, all data equipment, cable runway, building steel, etc.
   1. Combination hole and slot may be used for greater flexibility in connectivity.
      a. Field modification of mounting holes shall not be accepted.

C. Long barrel to maximize number of crimps and reduce pullout of copper conductors.
   1. Barrel shall have inspection window to ensure full conductor insertion.
   2. Ground conductor shall be fully crimped by compatible power crimper and dies.
      a. Hand crimping of lugs shall not be accepted.

D. Tin plated copper to inhibit corrosion.

E. Product:
   1. Code Conductor — Model: LCC-W Series

2.7 RACK / CABINET EQUIPMENT GROUNDING JUMPER CABLES

A. Bolt-on bonding jumper that connects rack to the vertical rack grounding bar.
   1. Conductor: #6 AWG insulated stranded copper.
   2. Factory terminated with one straight slotted lug, and one 90 degree bent slotted lug.
   3. Length: 60 inches, minimum.

B. Product:
   1. Equipment Jumper Kit — Model RGEJ660U

2.8 VERTICAL RACK GROUND BAR KIT

A. Tin plated copper conductor that attaches vertically to the rack equipment mounting rails to provide connection of rack mounted equipment with jumper to the telecommunications grounding busbar.
   1. 78.65 inch long, 0.67 inch wide, 0.05 inch thick, nominal.

B. Product:
   1. Ground Bar Kit- Threaded Rail — Model RGS134-1Y
   2. Ground Bar Kit- Cage Nut Rail — Model RGS134B-1

2.9 ELECTROSTATIC DISCHARGE (ESD) PORT KIT AND WRIST STRAP

A. Two hole ESD port with 5/8 inch hole spacing.
   1. Bent at 45 degree angle to hold wrist strap.
   2. Permanently marked with protective earth (ground) symbol.

B. Wrist strap: Adjustable fabric to provide rapid and continuous drain of electrostatic charge between a person and the surface that the wrist strap is bonded to.
   1. Connection: Six foot coiled cord with 1 megohm resistor and banana plug for insertion into ESD port.

C. Provide one wrist strap and ESD port at each rack or cabinet to prevent damaging static discharge into equipment.

D. Product:

1. ESD Wrist Strap — Model RGESDWS
2. ESD Port Kit for Threaded Rails — Model RGESD2-1
3. ESD Port Kit for Cage Nut Rails — Model RGESD2B-1

2.10 LIGHTNING PROTECTION

A. Category 6 Outdoor Cabling
   1. ITW Linx - Protects high performance 4 pair CAT6A Outside Plant (OSP) cables as well as CAT6A UTP cables (75V) operating voltage. For use with enhanced PoE, PoE+,-PoE++ End Span. Model CAT6A-75/PoE-RJ45

2.11 GROUNDING CLAMP FOR CONDUITS

A. Dual rated for copper conductors to copper pipe, galvanized pipe or steel conduit.

B. High strength aluminum alloy.
   1. Tin plated for corrosion and oxidation resistance.

C. Product:
   1. Pipe Grounding Clamp (0.5"- 1" Pipe) — Model GC-15A-Q
   2. Pipe Grounding Clamp (1.25" - 2" Pipe) — Model GC-18A-X
   3. Pipe Grounding Clamp (2.5"- 4" Pipe) — Model GC-22A-4

2.12 UNIVERSAL BEAM GROUNDING CLAMP

A. Copper grounding clamp in conformance with UL 467.
   1. Provides mounting pad suitable for a two-hole compression lug.
   2. Suitable on steel flanges from 1/4 inch through 5/8 inch.

B. Provide for any grounding connections made to beams.

C. Product:
   1. Universal Beam Grounding Clamp — Model GUBC500-6

2.13 SPLIT BOLT COPPER GROUNDING CLAMP

A. High strength copper alloy.
   1. Pressure bar with hex nut tightening.

B. Grounding connection for wire tray / baskets.

C. Product:
   1. Split Bolt - Copper — Model SBC3-C
   2. Split Bolt - Copper: Tin-Plated for galvanized — Model SBCT3-C

2.14 BONDING HARDWARE KITS

A. Bonding studs and nuts: Steel.
   1. Paint piercing serrations to create bonding point between the rack or cabinet and painted patch panels, mounted equipment, servers, busbars, and jumpers.
   2. Color: Green, to indicate bonding application.

B. Product:
   1. Bonding Stud Kit:
      a. For threaded #12-24 rail fasteners — Model TRBSK
      b. For threaded M6 rail fasteners — Model TRBSM6K
      c. For cage nut rail fasteners — Model CGNBSK
   2. Bonding Nuts:
      a. For threaded #12-24 rail fasteners — Model BGN-C

b. For cage nut rail fasteners Model BGN-C
c. For 1/4" thru-hole rail fasteners Model BGN-C
d. For threaded M6 rail fasteners Model BGNM6-C

2.15 PAINT PIERCING GROUNDING WASHER KIT

A. Bonds frame members on bolt-together racks.

B. Product:
1. Paint Piercing Grounding Washer Kit Model RGW-100-1Y

PART 3 EXECUTION

3.1 PREPARATION

A. Remove paint, rust, mill oils, surface contaminants at connection points using an abrasive pad and provide antioxidant compound.

B. Antioxidant shall be used when making all bonding connections in the field.

3.2 INSTALLATION

A. Install in accordance with BICSI TDMM Manual, TIA-607, and NFPA 70.

B. Install all components in accordance with manufacturer's installation instructions.

C. Install all components of the grounding system in a manner so that they are intentional, visually verifiable, adequately sized to handle expected currents safely, and to direct potentially damaging currents away from sensitive network equipment.

D. Install grounding for each rack / cabinet using 6 AWG THHN, rated for 90 degrees C, insulated, copper stranded conductor to copper communication grounding bus bar located in main telecommunications entrance facility.

E. No "daisy chaining" of racks / cabinets, each rack / cabinet shall have it's own independent connection to the telecommunications grounding bar within the data room either through a main common bonding network or homerun.

F. Bond main telecommunications grounding system to building grounding electrode system at main electrical service entrance location with 3/0 AWG copper stranded conductor.

G. Install routing for grounding conductor as short and direct as practical.

H. Install routing of bonding conductors with minimum number of bends and splices. Use sweeping bends.

I. Position grounding busbars near associated equipment and insulate from supports.

J. Ground data cabinets, racks, cable trays, air conditioning unit, building structure, metal piping and metal conduit located in all data rooms to the Telecommunications Grounding Busbar (TGB).

K. Install ground from each piece of equipment to MDF Room and IDF Room to grounding bar via an insulated cable no smaller than 6 AWG stranded copper wire. Power crimp proper grounding lug on cable where connecting to grounding bar.

L. Label grounding conductors and grounding bus bars in accordance with BICSI guidelines and Section 27 05 53 - Identification For Communications Systems.

M. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.3 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. See Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

C. Visually inspect from each bus bar to main grounding electrode service location.

D. Test in accordance with BICSI TDMM Manual, TIA-607 and NFPA 70.

E. When improper grounding is found during testing, check entire project, perform corrections, and perform retesting.

F. Installations not conforming to BICSI TDMM Manual, TIA-607 and NFPA 70 shall be subject to manufacturer grounding audit to identify correction requirements. Grounding audit and corrections required shall be at the expense of the contractor performing the improper installation.

END OF SECTION

SECTION 27 05 28
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cable Tray

B. J-Hooks

C. Cable Ties

1.2 REFERENCE STANDARDS

A. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.

B. NEMA VE 1 - Metal Cable Tray Systems; 2017.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.

E. NEMA VE 2 - Metal Cable Tray Installation Guidelines.

F. ANSI/UL 5 - Surface Metal Raceways and Fittings.

1.3 ADMINISTRATIVE REQUIREMENTS

A. See Section 01 30 00 - Administrative Requirements for Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.4 SCOPE

A. The Interior Communications Pathways will provide a distribution system for all system cabling that will be served by the systems shown on contract drawings. The pathways for a building may include all or some of the following, cable tray, continuous conduit systems, conduit stubs, sleeves, fire rated pathways, cable hangers, surface raceways. Interior pathway design shall follow all BICSI TDMM design recommendations and TIA568-B and TIA569-A standards.
   1. Cabling pathways will be concealed wherever possible.
   2. Corridors/Rooms/Spaces with inaccessible ceiling spaces (spline type ceilings, Hard ceilings) will require surface raceway on walls or ceilings.
   3. Exposed conduit and Raceway shall be run parallel and at right angles to building lines, and be painted to match existing surfaces.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for all products specified in this Section.

C. Shop Drawings: Include plan views indicating locations and routing.

1. Indicate proposed arrangement for Conduit pathway runs, Conduit Sleeve penetrations, and Conduits to be installed within structural concrete slabs (where permitted).
2. Indicate proposed arrangement for J Hook pathways.

D. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

E. Project Record Documents: Record actual routing of Major Pathways and locations of supports for cable tray.

1.6 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 CABLE TRAY SYSTEM - GENERAL REQUIREMENTS

A. Provide new cable tray system consisting of all required components, fittings, supports, accessories, etc. as necessary for a complete system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use cable tray for applications other than as permitted by NFPA 70 and product listing/classification.

D. Provide cable tray system and associated components suitable for use at indicated span/load ratings under the service conditions at the installed location.

E. Unless otherwise indicated, specified span/load ratings are based on safety factor of 1.5 and working load only (no additional concentrated static load), with ratings for metal cable tray systems in accordance with NEMA VE 1.

F. Unless otherwise indicated, specified load/fill depths and inside widths are nominal values, with values for metal cable tray systems in accordance with NEMA VE 1 including applicable allowable tolerances.

2.2 METAL CABLE TRAY SYSTEMS

A. Manufacturers:
1. Metal Cable Tray System:
   a. Cablofil, a brand of Legrand North America, Inc: www.legrand.us/#sle.
   b. Chatswoth Products, Inc.; OnTrac: www.chatsworth.com.
2. Substitutions: See Section 01 60 00 - Product Requirements.
3. Source Limitations: Furnish cable tray system and associated components and accessories produced by a single manufacturer and obtained from a single supplier.

B. Comply with NEMA VE 1.

C. Finishes:
1. Zinc Electroplated Steel: Comply with ASTM B633.

D. Metal Wire Mesh/Basket Cable Tray:
1. Material: Zinc electroplated steel or mill-galvanized before fabrication (pre-galvanized) steel.

2. Tray Depth: As indicated on drawings, but not less than 2 inches.
3. Span/Load Rating: As indicated on drawings.
4. Mesh Spacing: 2 by 4 inches.
5. Tray Width: As indicated on drawings, but not less than 6 inches.
6. Cross Wires: Round.
7. All straight section cross wires shall be constructed with a continuous longitudinal top wire safety edge. Safety edge must be T-welded on all tray sizes.

2.3 FIRE RATED CONDUIT PENETRATIONS

A. Description: The firestop assembly for use in through-penetration firestop systems. The assembly shall be classified for use in one-, two-, three-, and four-hour rated gypsum, concrete and block walls and shall match the fire rating of the wall/floor that is being penetrated. The assembly shall be classified for use in one-, two-, and three-hour rated concrete floors. Firestop between wall opening and around outside of conduit sleeves with Firestop material per Section 07 84 00.

B. Firestop Assembly(s) shall be in accordance with All applicable codes and Standards. Provide intumescent removable firestop forming material and putty around cables within conduit sleeves, or Fire Rated Conduit Sleeve Fittings for conduits 2" Dia. and above.

C. All conduit sleeves to have bushings or fittings for cable protection.

D. Provide acceptable grounding connection on conduit sleeves/bushings/fittings to allow for connection of ground wire per Sections 26 05 26, 27 05 26.

2.4 J-HOOKS

A. Saddle style cable supports / hangers.
1. Non-metallic cable support hook to prevent metal to cable contact, with integral cable retaining means.
2. Appropriate metallic hanging means for attachment to walls, ceilings, threaded rods, beams or purlins.
3. Tested and Listed in accordance with UL 2043 as suitable for use in air handling spaces.
4. Bundle capacity: Two inches, minimum.

B. Product:
1. Panduit; J Pro Cable Support: www.panduit.com.
2. Or Approved Equal
3. Substitutions: Section 01 60 00 - Product Requirements.

2.5 CABLE TIES

A. Reusable and releasable hook-and-loop style ties.
1. Width: 0.75 inch, minimum.
2. Operating range: -22 degrees F to 194 degrees F.
3. Color: Black.

B. Zip Ties shall not be permitted.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS WORK

A. Maintain access to existing cable tray and other pathway installations remaining active and requiring access. Modify installation or provide access panel to otherwise inaccessible spaces.

B. All pathways shall be evaluated prior to adding any cabling within.

C. Existing cable tray pathways that are re-used shall not be filled beyond 40% fill factor and where applicable at wall penetrations, shall be firestopped per applicable ratings and codes.

D. Existing Conduit Sleeve penetrations that are abandoned shall be Firestopped/infilled per applicable ratings and codes.

3.2 INSTALLATION

A. Support all pathways and fasten to structure with hardware specifically designed to support the total weight of the pathway and all included cables. Install supports at each connection point, at end of each run, and at other points to maintain the weight limit and to withstand cable pulling.

B. Firestop Assembly(s) shall be labeled in accordance with UL F ratings and T ratings at both sides of penetration. Provide label on wall below / near the firestop assembly in a location that is easily seen.

C. J Hooks: Install cable types in separate open cable hanger segment. Do not mix coaxial, optical fiber cable or any other cable type in the same support. If cables have more than 12 inches of sag, install additional J-Hooks. Cables to maintain minimum 4 inches above ceiling grid. At no point shall cable(s) rest on acoustic ceiling grids or panels.

D. If a conduit run requires:
   1. More than two 90 degree bends, provide a pull point or pull box between sections with two bend or fewer.
   2. A reverse bend (between 100 degrees and 180 degrees) insert a pull point or pullbox at each bend having an angle from 100 degrees and 180 degrees.
   3. A third 90 degree bend (between pull points or pull boxes) Derate conduit capacity of the run that has the third bend by 15% except when:
      a. the total run is not longer than 33 feet.
      b. the conduit size is increased.
      c. One of the bends is located within 12 inches of the cable end feed.

E. Maintain Conduit Bend Radius:
   1. 4-pair balanced twisted pair (CAT 6) - 4 times the outside diameter (at rest or during pull).
   2. Multipair balanced twisted pair cable - 10 times the outside diameter.
   3. Telecommunications bonding backbone- 3 times the outside diameter.

F. Where raceways or cable trays penetrate fire-rated walls, floors or roofs, sleeve and seal opening around raceways and cable trays with UL listed firestop assemblies equal to fire rating of walls, floors or roofs. Seal penetrations through all floors or roofs to provide and maintain a watertight installation. Conduit sleeves, where required, shall be sized for proper sealing and extend Min. 2 inches above the surface. The installation shall be in compliance with UL listed firestopping assembly.

G. Conduits shall be:
   1. Clean dry and unobstructed

2. Reamed and fitted with bushings. Metal conduits to have ground clip / ground wire connectors
3. Labeled for identification
4. Equipped with a pull cord that has a min. test rating of 90kg (200lb.)

H. A pull cord that has a min. test rating of 90kg (200lb. shall be co-installed with all cable installed in any pathway.

I. Cable pathways shall not be filled greater than the TIA/EIA-569-A maximum fill for the particular type.

J. Pathways deemed overfilled upon installation will not be accepted and shall be remedied at Contractor expense.

K. Install expansion connectors where recommended by manufacturer as indicated on Drawings.

L. Install firestopping in accordance with Section 07 84 00 to sustain ratings when passing cable pathway through fire-rated elements.

3.3 CLOSEOUT ACTIVITIES

A. See Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual routing of Major Pathways and locations of supports for cable tray.

END OF SECTION

SECTION 27 05 53
IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Labels

B. Wire markers

C. Conduit markers

1.2 RELATED REQUIREMENTS

A. Section 27 05 26 - Grounding and Bonding For Communications Systems.

B. Section 27 10 05 - Communications Copper Cabling.

C. Section 27 11 16 - Communications Cabinets, Racks, Enclosures, & Accessories.

D. Section 27 15 23 - Communications Optical Fiber Cabling.

1.3 REFERENCE STANDARDS

A. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.

B. TIA-606-B - Administration Standard for Telecommunications Infrastructure; Rev B, 2012 (with Addenda; 2015).

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard product data sheet, including part number and description for each product

C. Shop Drawings: Submit labeling plan for review and approval prior to commencing labeling.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

A. Panduit: www.panduit.com.

B. Or approved equal.

C. Substitutions: See Section 01 60 00 - Product Requirements, for substitution procedures.

2.2 LABELS AND WIRE MARKERS

A. Comply with the requirements of TIA-606 and TIA-606-B standards.

B. Thermal transfer, laser, or inkjet type.

C. Lettering: Black on white background.
   1. Sized according to label; not less that 1/8 inch.

D. Application:

1.	Cat6 Cables	Self Laminating	Model S050X150YAJ
2.	Fiber Cables	Sleeve	Model NWSLC-2Y
3.	Faceplates	Non-Adhesive	Model UILS8BW
4.	Patch Panels	Non-Adhesive	Model UILS8BW
5.	Ground Busbars	Super-tack	Model C200X100YPT
6.	Grounding/ Bonding Conductors	Tag	Model LTYK
7.	Data Outlets	Non-Adhesive	Model C195X040Y1J
8.	Security Cameras	Continuous tape	Model T038X000FJC-BK
9.	Wireless Access Points	Continuous tape	Model T038X000FJC-BK

2.3 CONDUIT AND RACEWAY MARKERS

A. Vinyl snap-on, non-adhesive:

1.	Fiber Conduit and Innerduct Label	Model PCV-FORY

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Follow manufacturer's requirements for preparation.

C. Install identifying devices after completion of any painting.

3.2 INSTALLATION

A. Follow manufacturer's requirements for installation.

B. Mark data cabling within 2 inches from each end. Install additional marking at accessible locations along the cable run.

C. All labels shall be installed such that they will be visible following installation.
   1. Install parallel to cables or equipment lines.

D. Contractor shall install identification on all of the following:
   1. Copper Horizontal Cabling at each end.
   2. Data Outlets and connectors at each end.
   3. Copper Patch Panels.
   4. Fiber Cabling at each end.
   5. Fiber connectors at each end.
   6. Fiber Patch Panels.
   7. Communications Grounding Busbars.
   8. Communications Grounding and Bonding Conductors.
   9. Security Cameras.
   10. Wireless Access Points.

E. All labeling nomenclature shall comply with TIA-606-B cable labeling standards and as further outlined below:
   1. Data Outlets (any faceplate or surface mount box containing cat-6 data jacks)
      a. Data outlet labels to indicate TR-RK-PP-PRT where:
         1) TR = 2-digit number of Telecommunications Room
         2) RK = 2-digit number of Rack
         3) PP = 2-digit number of Patch-Panel
         4) PRT = 2-digit number port designation of patch-panel

b. Data Outlets serving security cameras and wireless access points shall follow the same protocol outlined above.

END OF SECTION

SECTION 27 10 05
COMMUNICATIONS COPPER CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Communications system design requirements.

B. Communications pathways.

C. Copper communications cable and terminations.

D. Copper Communications cable and interconnecting devices.

E. Communications equipment room fittings.

F. Communications outlets.

G. Communications grounding and bonding.

H. Communications identification.

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 26 05 33.16 - Boxes for Electrical Systems.

C. Section 27 05 26 - Grounding and Bonding For Communications Systems.

D. Section 27 05 53 - Identification For Communications Systems.

E. Section 27 15 55 - Communications Cable Testing.

1.3 REFERENCE STANDARDS

A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.

B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; Revision E, 2005.

C. FM (AG) - FM Approval Guide; current edition.

D. ICEA S-90-661 - Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cables (With or Without An Overall Shield) For Use in General Purpose and LAN Communications Wiring Systems Technical Requirements; 2012.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air Handling Spaces.

G. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2019.

H. TIA-569 - Telecommunications Pathways and Spaces; 2019e.

I. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.

J. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d.

K. UL (DIR) - Online Certifications Directory; Current Edition.

L. UL 444 - Communications Cables; Current Edition, Including All Revisions.

M. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages, specifications and data sheets for each product incorporated into the Work.

C. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

D. Evidence of qualifications for installer.

E. Installer certification from the cable manufacturer MUST be submitted as part of the bid de-scoping process. The Certified Installer certificate cannot be site specific to this project and must be pre-existing for 12 months prior to the bid due date.

F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

G. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.

H. Field Test Reports.

I. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
1. Record actual locations of outlet boxes and distribution frames.
2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
3. Identify distribution frames and equipment rooms by room number on drawings.

J. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.6 QUALITY ASSURANCE

A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

B. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.

C. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owner's representative.

D. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified, and subject to the approval of the Engineer.

E. Installer Qualifications:
   1. Company specializing in installing products specified in this section with minimum three years documented experience, and with service facilities within 120 miles of project. The contractor must be approved by the manufacturer for cabling solutions – a qualified BICSI trained installer who also is certified to install the solution able to be warrantied by the Manufacturer.
   2. The contractor is responsible for workmanship and installation practices in accordance with the Manufacturer's Certified Program. Contractor Project Manager on site must be manufacturer certified in the copper information transport systems to be installed. At least 30 percent of the installation and termination crew must be certified by Manufacturer with a Technicians Level of Training.
   3. Manufacturer accepted installer qualifications based on the following:
      a. Panduit Corp.
         1) Panduit Certified Installer (PCI)
         2) Panduit Certified Technician (PCT)
      b. Belden Partner Alliance Program
      c. Legrand Ortronics
         1) Ortronics Certified Installer (CI)
         2) Ortronics Certified Technician (CIT)

F. Contractor must have 3 years experience in the installation and testing of the type of system specified, and:
   1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
   2. All Supervisors and a minimum of 30% of installers factory certified by manufacturers of products to be installed.
   3. Employing BICSI Registered Cabling Installation Technicians (RCIT) for supervision of all work.
   4. Provide evidence from at least two projects that have been in use for at least 18 months; submit project name, address, and written certification by user.
   5. Field technicians shall have a minimum of 3 years experience in the installation of the type of system specified.

G. Products: Listed, classified, and labeled as suitable for the purpose intended.

H. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

I. Conform to requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep stored products clean and dry.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Date of Substantial Completion.

C. Manufacturer shall provide a complete Cable Products Static, Dynamic, and Applications Warranty for a period of 20 years for high performance cabling systems that meet application requirements. The warranty shall include all cable installed in the structured cabling system.

D. Warranty shall be written in the name of the Owner, and include the following:
1. Identification of the Manufacturer's Certified Installer.
2. That the Installer has completed the Manufacturer's Certification Program.
3. That the Installer has fulfilled all the requirements of the Manufacturer's Certified Program.

PART 2 PRODUCTS

2.1 CATEGORY 6A HORIZONTAL CABLE (PLENUM RATED)

A. Product Description: Category 6A, 100-ohm, plenum rated cable, 23 AWG copper conductors twisted in 4 pairs and separated by a cross-divider. The cable shall be compliant with IEEE 802.3af and IEEE 802.3at POE applications. The cable shall be capable of 10GBase-T Ethernet.

B. Manufacturers:

1.	Panduit CAT-6A Cable	Model - PUP6AV04BU-G
2.	Superior Essex CAT-6A Cable	Model - 6S-220-2P
3.	General Cable CAT-6A Cable	Model - 7131786

C. Color:

1.	General Use Data	Blue
2.	Wireless Access Points	Blue
3.	Security Cameras	Purple

2.2 CATEGORY 6A DATA JACKS

A. Product Description: Augmented Category 6, 8-position, 8-wire universal module. Contacts plated with 50 micro inches of gold. Compatible with Mini-Com Modular Patch Panels, Faceplates, and Surface Mount Boxes. Terminates 4 pair 22-26 AWG, 100 ohm cable and shall not require the use of a punch down tool. Wiring Scheme: T568B
1. Shuttered CAT6A Jacks to be used for all above ceiling applications unless otherwise noted.
2. Corrosive Resistant Jacks to be used in harsh/humid environments.

B. Manufacturers:

1.	CAT6A - Panduit Mini-Com TX6 10Gig Jack	Model CJ6X88TG
2.	CAT6A - Panduit Mini-Com TX6 10Gig Shuttered Jack	Model CJH6X88TG
3.	CAT6A - Belden CAT 6A REVConnect CAT6A Jack Bulk	Model RVAMJKU
4.	CAT6A - Ortronics Clarity HDJ6A Jack	Model OR-HDJ6A

C. Color:

1.	General Use Data	Blue
2.	Wireless Access Points	Blue
3.	Security Cameras	Purple

2.3 CATEGORY 6A PATCH CABLES

A. Product Description: Category 6A, 28 AWG, 10 Gb/s UTP patch cord with TX6A 10Gig Modular Plugs on each end.

B. Manufacturers:
1. Panduit Patch Cables (for Data Room End - 1 Per Data drop) Model UTP28X[X]**
2. Panduit Patch Cables (for Device End - 1 Per Data drop) Model UTP28X[X]**
3. Panduit 36" Patch Cables (for Surge Protection Device - 1 Per Data drop requiring surge protection) Model UTP6A3
4. Belden Patch Cables (for Data Room End - 1 Per Data drop) Small Diameter Patch Cords (where xxx equals footage length) Model CAD11006xxx
5. Belden Patch Cables (for Device End - 1 Per Data drop) Small Diameter Patch Cords (where xxx equals footage length) Model CAD11006xxx
6. Belden Patch Cables (for Surge Protection Device - 1 Per Data drop requiring surge protection) Small Diameter Patch Cords (where xxx equals footage length) Model CAD11006004
7. Ortronics Patch Cables (for Data Room End - 1 Per Data drop) Model OR-MC6A[xx]-06
8. Ortronics Patch Cables (for Device End - 1 Per Data drop) Model OR-MC6A[xx]-06
9. Ortronics 36" Patch Cables (for Surge Protection Device - 1 Per Data drop requiring surge protection) Model OR-MC6A03-03

C. Lengths:

1.	Data room end Locations with Data Cabinets	3 foot	([x] = 3)
2.	Data room end Locations with Data Racks	6 foot	([x] = 6)
3.	Wireless access point device location	6 foot	([x] = 6)
4.	Security Camera device location	6 foot	([x] = 6)
5.	General Data outlet location	10 foot	([x] = 10)

D. Color:

1.	General Use Data	Blue
2.	Wireless Access Points	Blue
3.	Security Cameras	Purple

E. Additional Installation notes:
1. Contractor to establish proper wire management for patch cables from patch panels to switches. “Spider Webbing” with patch cables will not be accepted.
2. Patch cables shall not be shorter than 36".

2.4 DATA FACEPLATES

A. Product Description: Single gang vertical faceplate accepts two to six Mini-Com® Modules, includes label pockets.

B. Manufacturers:
1. Panduit Mini-Com Classic Series
   a. Two Module Model CFPSL2S
   b. Four Module Model CFPSL4S
   c. Six Module Model CFPL6SY
   d. Provide Blank Modules for all unused module spaces. Model CMBIG-X
2. Belden: Compatible with REVConnect jacks.
   a. Two Port White Model AX104231
   b. Four Port White Model AX 104232
   c. Six Port White Model AX 104233
   d. Blank Inserts White Model AX 104456
3. Ortronics HDJ Clarity Series
   a. Two Module Model OR-403STJ12

b. Four Module Model OR-403STJ14
c. Six Module Model OR-40300457
d. Provide Blank Modules for all unused module spaces Model 4100002-87

2.5 DATA OUTLET BOXES

A. Product Description: Shuttered surface mount box accepts up to two Modules.

B. Manufacturers:
1. Panduit Mini-Com Shuttered Surface Mount Box Model CBX2IW-AY
a. For all above ceiling terminations and/or outlet locations.
2. BeldenTwo-Port with Shuttered Door and ID Window Model AX102652
a. For all above ceiling terminations and/or outlet locations.
3. Ortronics Clarity HDJ Surface Mount Boxes Model OR-PHAHJU48
a. For all above ceiling terminations and/or outlet locations.

C. Mounting:
1. Panduit magnets to mount Surface Mount Boxes to structural steel or other permanent metal surface where possible. Model CBM-X
2. Hook and Loop Cable ties may be used to mount Surface Mount Boxes where magnets cannot be used.
3. Wall anchors may be used where the Surface Mount Box is located in an exposed area (such as gymnasium) AND there is no possible asbestos material.

2.6 DATA PATCH PANELS

A. Product Description: TIA/EIA 568, rack-mounted assembly of terminals and accessory patch cords, with adequate capacity for active and spare circuits. 1RU. For all unused positions provide blank module.

B. Manufacturers:
1. Panduit Mini-Com 48 Port HD Blank Patch Panel Model CPP48HDWBLY
a. Provide with each Patch Panel:
b. Strain Relief Bar Model SRB19BLY
1) Panduit quick release brackets for SRB Model SRBBRKT
2. Belden Modular Patch Panel Empty 48 port 1U Model AX103121
a. Belden strain relief bar is included with the patch panel.
3. Ortronics Clarity HDJ 48 Port Patch Panel Model OR-PHAHJU48
a. Ortronics strain relief bar is included with the patch panel.

C. Patch panel to be mounted at a minimum of 4 points.

2.7 SPEAKER CABLING

A. Plenum Cable for Speaker Circuits: 18 AWG copper conductor, shielded, 2 conductor, and covered with a nonmetallic jacket; suitable for use for Class 2 circuits in air handling ducts, hollow spaces used as ducts, and plenums.
1. Belden Part Number 6300FE

2.8 SUBSTITUTIONS

A. Substitutions Allowed: None

B. Contractor shall be responsible and assume all costs for removal and replacement of any substituted product installed without prior written approval. Such costs shall include, but not be limited to labor, materials as well as any penalties, fees or costs incurred for late completion.

2.9 SYSTEM DESIGN

A. Provide a complete permanent end to end system of cabling and pathways for data communications, including but not limited to cables, conduits and wireways, pull wires, support structures, support devices, racks and cabinets, outlets, patch panels, and patch cables.
   1. Comply with TIA-568 (SET) (cabling) and TIA-569 (pathways) (commercial standards).
   2. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
   3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
   4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.

B. System Description:
   1. Provide additional outlets where indicated on drawings.

C. Intermediate Distribution Frames (IDF): Support structures for terminating horizontal cables that extend to telecommunications outlets.
   1. Locate intermediate distribution frames as indicated on the drawings.

D. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.10 GROUNDING AND BONDING COMPONENTS

A. Comply with TIA-607.

B. Comply with Section 27 05 26 - Grounding and Bonding For Communications Systems .

2.11 IDENTIFICATION PRODUCTS

A. Comply with TIA-606.

B. Comply with 27 05 53 - Identification For Communications Systems.

2.12 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Factory test cables according to TIA-568 (SET).

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.

B. All Networks shall be installed per applicable standards and manufacturer's requirements.

C. Comply with Communication Service Provider requirements.

D. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.

E. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

F. Contractor must remove all abandoned cable per Article 800 of the National Electrical Code and per TIA and BICSI standards, recycling these materials where possible. Removal of orphaned cable is mandatory. Contractors must consider this when placing bids.

3.2 INSTALLATION OF PATHWAYS

A. Outlet Boxes:
1. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of telecommunications outlets provided under this section.
a. Mounting Heights: Unless otherwise indicated, as follows:
1) Telephone and Data Outlets: 18 inches above finished floor.
2) Telephone Outlets for Side-Reach Wall-Mounted Telephones: 48 inches above finished floor to top of telephone.
3) Telephone Outlets for Forward-Reach Wall-Mounted Telephones: 48 inches above finished floor to top of telephone.
b. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
c. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
d. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.
e. Locate outlet boxes so that wall plate does not span different building finishes.
f. Locate outlet boxes so that wall plate does not cross masonry joints.
g. Outlet boxes shall be secured to building with mechanical fasteners. Adhesive fasteners are not allowed.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

A. Copper Cabling:
1. Use only type CMP plenum-rated cable, do not install below 32°F. If cable is stored below 32°F allow the cable to condition to room temperature 68°F as close to room temperature +/- 10°F 48 hours prior to installation.
2. Horizontal distribution cables shall be bundled in groups of no more than manufacturers recommendations. Cable bundle quantities in excess of manufacturers recommendations may cause deformation of the bottom cables within the bundle and degrade cable performance.
3. Maintain cable geometry; do not untwist more than .125 inch from point of termination.
4. Any cable installed by the contractor exceeding 90 meters (295 feet) long must be replaced and routed to reduce length to 90 meters or less. Complete all cable re-routing at no additional cost to the Owner. Identify in writing to Architect/Engineer prior to installation of any cables that cannot be reduced to 90 meters or less in length.
5. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
6. Do not pre pull cable out of box / reel prior to installing.
7. Do not over-cinch or crush cables.
8. Do not exceed manufacturer's recommended cable pull tension.
9. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
10. Protect from paint and other damaging contaminants. (any painted / contaminated cables shall be replaced at contractor's expense).
11. Leave sufficient slack in the ceiling to reach any telecommunications outlet/connector within room.
12. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware

shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

13. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits
14. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.
15. Install category 6,6A cable in a separate open cable hanger segment. Do not install with coaxial, optical fiber cable or any other cable type.
16. If cables have more than 12” of sag, install more hangers.
17. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
18. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket. Cables with defects shall be replaced.
19. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.

B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
   1. Cabinet / Rack end: 10 feet
   2. Outlet end: 10 feet
      a. At Distribution Frames: 10 feet.
      b. At Outlets - Copper: 12 inches.

C. Identification:
   1. Use mechanically generated wire and cable markers to identify cables at each end.
   2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.
   3. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Comply with inspection and testing requirements of specified installation standards.

C. Visual Inspection:
   1. Inspect cable jackets for certification markings.
   2. Inspect cable terminations for color coded labels of proper type.
   3. Inspect outlet plates and patch panels for complete labels.

D. Testing per 27 15 55 - Communications Cable Testing

E. Labeling per 27 05 53 - Identification For Communications Systems

F. Inspect patch cords for complete labels.

G. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

H. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

3.5 CLOSEOUT ACTIVITIES

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Provide manufacturer warranty documentation, ensure that forms have been completed in Owner's name, and registered with the manufacturer.

C. Project Record Documents: Record actual locations and sizes of pathways, outlets, and jacks.
   1. Field Test Reports, one hard copy, one PDF copy and one software based copy (ex.: .FLW).

END OF SECTION

SECTION 27 11 16
COMMUNICATIONS CABINETS, RACKS, ENCLOSURES, & ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Communication Cabinets.

B. Wire Management.

C. Uninterruptible Power Supplies.

1.2 RELATED REQUIREMENTS

A. Section 27 05 26 - Grounding and Bonding For Communications Systems.

B. Section 27 05 53 - Identification For Communications Systems.

1.3 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; Revision E, 2005.

C. NECA/BICSI 607 - Standard for Telecommunications Bonding and Grounding Planning and Installation Methods forCommercial Buildings; 2011.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. PS 1 - Structural Plywood; 2009.

F. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2019.

G. TIA-569 - Telecommunications Pathways and Spaces; 2019e.

H. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations.
   2. Installation methods.

C. Manufacturer Qualification Statement.

D. Installers Qualification Statement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least 5 years experience manufacturing products of the type specified.

B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
   1. Supervisors and installers factory certified by manufacturers of products to be installed.

2. Employing BICSI Registered Cabling Installation Technicians (RCIT) for all work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep stored products clean and dry.

1.7 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL

A. All cabinet, racks, panels, and associated equipment shall comply with EIA/ECA-310 and TIA-606 standards.

B. All cabinet, racks, panels, and associated equipment shall be properly grounded and bonded. See Section 27 05 26 - Grounding and Bonding For Communications Systems for related equipment and requirements.

2.2 COMMUNICATON CABINETS:

A. 48" Wall Mount Cabinet
   1. Great Lakes WLP Wall Mount Cabinet Model GL48WLP-B-SH-AF
      a. Color - Black
      b. Great Lakes Fan Kit Part No. 7217-04
         1) 75 CFM
      c. Panduit Horizontal Cable Manager (Provide 3) Model NMF2

B. Locks: All locks in this project shall be keyed alike

2.3 WIRE MANAGEMENT

A. Horizontal Wire Managers:
   1. Great Lakes 19" Horizontal Cable Organizer Model CM-05

2.4 UNINTERRUPTIBLE POWER SUPPLIES

A. Vertiv Liebert GXT5 Lithium-Ion Online UPS 1500VA/1350W 120V R/T w/ RDU101
   1. Liebert GXT4 UPS, 1,500VA Model GXT5LI-1500LVRT2UXLN

2.5 SYSTEM DESIGN

A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
   1. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
   2. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.

2.6 MOUNTING BOARDS

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   1. Size: 48 inches wide by 96 inches high.
   2. Do not paint over UL label.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA-568 (SET), TIA-569, NECA/BICSI 607, NFPA 70, and SYSTEM DESIGN as specified in PART 2.

3.2 INSTALLATION OF EQUIPMENT

A. Wall-Mounted Racks and Enclosures:
   1. Install to plywood backboards only, unless otherwise indicated.

B. Floor-Mounted Racks and Enclosures: Permanently anchor to floor in accordance with manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

A. Comply with inspection and testing requirements of specified installation standards.

END OF SECTION

SECTION 27 15 23
COMMUNICATIONS OPTICAL FIBER CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. System Design

B. Campus Fiber Optic Backbone Cabling

C. Rack Mounted Housings

D. Wall Mounted Housings

E. Pig Tail Cassettes

F. Splice Protectors

G. Fiber Optic Patch Cables

1.2 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 27 05 26 - Grounding and Bonding For Communications Systems.

C. Section 27 05 53 - Identification For Communications Systems.

D. Section 27 15 55 - Communications Cable Testing.

1.3 REFERENCE STANDARDS

A. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; Revision E, 2005.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. TIA/EIA-568 - Commercial Building Telecommunications Cabling Standard. (consists of 3 Parts, listed below); Rev C, 2012, and latest addenda.

D. TIA-455-21 - FOTP-21 - Mating Durability of Fiber Optic Interconnecting Devices; 1988a (Reaffirmed 2012).

E. TIA-492AAAB-A - Detail Specification for 50-um Core Diameter/125-um Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers; 2009a.

F. TIA-492CAAA - Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers; 1998 (Reaffirmed 2002).

G. TIA-526-14 - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; 2015c.

H. TIA-526-7 - Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant; 2015a.

I. TIA-568.1 - Commercial Building Telecommunications Infrastructure Standard; 2015d.

J. TIA-568.3 - Optical Fiber Cabling and Components Standard; 2016d.

K. TIA-569 - Telecommunications Pathways and Spaces; 2019e.

L. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.

M. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d.

N. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

O. UL 444 - Communications Cables; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Communications Service Provider representative.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used. The exact part numbers, colors and counts that are intended to be used shall be marked clearly on the submittal or it will be marked Revise and Re-Submit.

C. Installer certification from the cable manufacturer MUST be submitted as part of the bid de-scoping process. The Certified Installer certificate cannot be site specific to this project and must be pre-existing for 12 months prior to the bid due date.

D. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.

E. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

F. Field Test Reports must be submitted bi-weekly to the construction manager that updates the status of each fiber optic cable installation, termination, testing and warranty.

G. Project Record Documents shall be submitted at the conclusion of the project with the following information..
1. Record actual locations of cable routing, IDF locations, enclosures and panels.
2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
3. Fiber Test Results
4. Warranty Information
5. Operations & Maintenance Data

H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.

B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
   1. Supervisors and installers factory certified by manufacturers of products to be installed.
   2. Employing experienced technicians for all work; show at least 3 years experience in the installation of the type of system specified, with evidence from at least 2 projects that have been in use for at least 18 months; submit project name, address, and written certification by user.

C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

D. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

E. All work shall be provided in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents, shall be provided in accordance with industry standards and shall be subject to the control and approval of the Owners representative.
   1. Any violations of applicable standards or codes committed by the Contractor shall be remedied at the Contractor’s expense.

F. Equipment and materials shall be of the quality and manufactures indicated. The equipment specified is based on the acceptable manufacturers listed. Where "approved equal” is stated, equipment shall be equivalent in every way to that of the equipment specified, and subject to the approval of the Engineer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep stored products clean and dry.

1.8 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 2 year period after Date of Substantial Completion.

C. System Warranty
   1. A Certification / System Warranty shall provide a complete system warranty to guarantee end-to-end high performance cabling systems that meet application requirements. The guarantee shall include all fiber optic connectivity components. The system shall be warranted for a period of a minimum of 20 years.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

A. Provide a complete permanent fiber optic communication cabling system including cables, connectors, housings and support structures. The basis of design is 10GBase-T for all fiber optic links with additional 40GBase-T & 100GBase-T requirements for Single-Mode Fiber Optic LAN applications.

1. Campus Backbone Cabling - Interconnection between campus buildings using OS2 fiber optic cabling.
2. LAN Backbone Cabling - Interconnection between MDF & Multiple IDFs throughout the building using OM3/4 & OS2 fiber optic cabling.
3. Service Entrance Fiber Optic Cabling
4. Field Device Fiber Optic Cabling

B. Main Distribution Frame (MDF): Centrally located support structure for terminating backbone cables, functioning as point of presence to external service provider.
1. For the entire campus there is one main Network Operations Center (NOC) and for each building there is a main distribution frame (MDF) that functions as the central frame for that building. Locate main distribution frame as indicated on the drawings.
2. Capacity: As required to terminate all cables required by design criteria plus minimum 25 percent spare space.

C. Intermediate Distribution Frames (IDF): Support structures for terminating horizontal cables that extend to telecommunications outlets. Locate intermediate distribution frames as indicated on the drawings.

D. Backbone Cabling: Cabling, pathways, and terminal hardware connecting intermediate distribution frames (IDF's) with main distribution frame (MDF), wired in star topology with main distribution frame at center hub of star.

E. Fiber optic cabling not to exceed the max distance listed below to support 10 Gigabit transmission (including all patch cables).

Fiber Optic Type	Max Distance (Feet)	Max Distance (Meters)
OM3 Mulitimode	984	300
OM4 Multimode	1,312	400
OS2 Singlemode	32,808	10,000

2.2 CAMPUS BACKBONE SINGLE MODE COMMUNICATIONS CABLING (INDOOR/OUTDOOR)

A. Description: Fiber Optic (nonmetallic, Plenum Rated, flame-retardant, UV-resistant, 900 µm buffered fibers) indoor/outdoor single mode cable designed for aerial, duct and direct-buried applications with no need for a transition splice when entering the building. Shall be installed between the MDF's of the buildings identified on the drawings.

B. Manufacturer: Corning: www.corning.com
1. Corning FREEDM **OM4** 12-Strand Model: 012TPU-T3198D2H

2.3 CCH RACK MOUNTED CONNECTOR HOUSING (AT PRESS BOX)

A. Description: Housings designed for rack mounting in 19 inch racks (1.75 -in EIA hole spacing). Rack space options of 1U (two panels, cassettes or modules), 2U (four panels, cassettes or modules), 3U (six panels, cassettes or modules) and 4U (12 panels, cassettes or modules). The 1U, 2U and 3U options feature a slide out tray and see through, removable top covers. The CCH -04U features a clear door, removable front and rear enclosures and a platinum colored interior for maximum visibility and access.

B. Manufacturer: Corning: www.corning.com
1. 1U Model: CCH-01U

2.4 WALL MOUNTED SINGLE-PANEL CONNECTOR HOUSING (AT CONCESSIONS BUILDING)

A. Description: Provides interconnect or cross -connect capabilities between the outside plant, riser or distribution cables and the opto -electronics.

B. Manufacturer: Corning: www.corning.com
   1. 1-Position Housing — Model: SPH-01P

2.5 CCH PIGTAIL CASSETTES

A. Description: The CCH Pigtailed Splice Cassettes are pre-loaded and pre-routed for quick fusion splicing of fiber pigtails, utilizing the same space-saving platform as the standard CCH Splice Cassette. They are loaded with a pigtail assembly and a CCH Connector Panel. The pigtails have 900 µm protection at the connector panel for added durability, routed into the splice tray layer for ease of splicing. The Pigtailed Cassette allows the elimination of individual splice trays or separate splice housings, as well as allowing splicing to be done away from the rack housing in a suitable workspace as needed. Each cassette is shipped with the CCH Connector Grommets and cable ties for additional strain relief and protective tubing for incoming cable are also included. Splicing cassettes ship with the appropriate number and type of fiber heat-shrink splice protectors.

B. Manufacturer: Corning: www.corning.com
   1. OM4 12 fiber LC — Model: CCH-CS12-E4-P00QE

2.6 HEAT-SHRINK FUSION SPLICE PROTECTORS

A. Description: 60mm long splice protector

B. Manufacturer: Corning: www.corning.com
   1. 60mm Heat-Shrink Fusion Splice Protectors — Model: 2806031-01

2.7 FIBER OPTIC PATCH CABLES

A. Description: Pretium EDGE® reverse polarity uniboot duplex jumpers allow for the quick and easy conversion from a TIA-568 A-B polarity to a TIA-568 A-A polarity without exposing the fibers or needing any tools. This jumper comes with a straight-through polarity from the factory but you can convert it to a flipped jumper with no tools. This uniboot design allows one cable to carry both fibers, reducing jumper bulk when routing.

B. Manufacturer: Corning: www.corning.com
   1. LC Duplex to LC Duplex
      a. OM4 — Model: 797902Q***M

C. Provide 12 patch cables of the same type (OM4) per 12 fiber cable installed

2.8 SINGLE-FIBER PORT CLEANER

A. Description: Single -fiber port cleaners designed to clean connector end faces in patch panels and adapters. An integrated dust cap allows for cleaning unmated connector end faces. These cleaners are easy to use and offer over 525 cleanings.

B. Manufacturer: Corning: www.corning.com
   1. 1.25mm LC connector cleaner — Model: CLEANER-PORT-LC

2.9 SUBSTITUTIONS

A. Section 01 60 00 - Product Requirements.

B. This is a performance-based solution. Substitutions must follow the same rigid standards for quality and termination style as those described above.

C. ANY CONTRACTOR WISHING TO OFFER FIBER OPTIC CABLING PRODUCTS OTHER THAN THOSE SPECIFIED HEREIN SHALL SUBMIT A REQUEST FOR PRODUCT SUBSTITUTION IN WRITING NO LESS THAN ONE WEEK IN ADVANCE OF BID. WRITTEN REQUESTS FOR SUBSTITUTION SHALL BE ACCOMPANIED BY ALL DRAWINGS, SPECIFICATION SHEETS AND ENGINEERING DOCUMENTS, AS WELL AS THIRD PARTY LABORATORY PERFORMANCE TEST RESULTS PROVING EQUIVALENCY IN PERFORMANCE AND MANUFACTURING STYLE.

D. This written documentation shall be accompanied by samples of the substitution product offered for evaluation. Equal product acceptance must be received in writing.

E. Contractor shall be responsible and assume all costs for removal and replacement of any substituted product installed without prior written approval. Such costs shall include, but not be limited to labor, materials as well as any penalties, fees or costs incurred for late completion.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA/EIA-568, TIA/EIA-569, ANSI/J-STD-607, NFPA 70, and SYSTEM DESIGN as specified in PART 2.

B. Comply with TIA-570, latest edition.

C. Provide fixed cables and pathways that comply with NFPA 70 and ANSI/J-STD-607 and are UL listed or third party independent testing laboratory certified.

D. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.

E. Cabling terminations to follow industry standard color code as follows:
1. Blue
2. Orange
3. Green
4. Brown
5. Slate
6. White
7. Red
8. Black
9. Yellow
10. Violet
11. Rose
12. Aqua
13. Fiber 13 to 24: Repeated, but with a black tracer added (except for black, which has a white tracer).

F. Contractor must remove all abandoned cable per Article 800 of the National Electrical Code and per TIA and BICSI standards, recycling these materials where possible. Removal of orphaned cable is mandatory. Contractors must consider this when placing bids.

3.2 PATHWAYS

A. Install with the following minimum clearances:

1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
2. 12 inches from power conduits and cables and panelboards.
3. 5 inches from fluorescent and high frequency lighting fixtures.
4. 6 inches from flues, hot water pipes, and steam pipes.

B. Conduit:
1. Do not install more than 2 (two) 90 degree bends in a single horizontal cable run.
2. Leave pull cords in place where cables are not initially installed.
3. Conceal conduit under floor slabs and within finished walls, ceilings, and floors except where specifically indicated to be exposed.
   a. Conduit may remain exposed to view in mechanical rooms, electrical rooms, and telecommunications rooms.
   b. Treat conduit in crawl spaces and under floor slabs as if exposed to view.
   c. Where exposed to view, install parallel with or at right angles to ceilings, walls, and structural members.
   d. Under floor slabs, locate conduit at 12 inches, minimum, below vapor retarder; seal penetrations of vapor retarder around conduit.

C. Grounding and Bonding: Perform in accordance with ANSI/J-STD-607 and NFPA 70.
1. Conform to requirements as specified in 27 05 26 - Grounding and Bonding For Communications Systems.
2. Where metallically shielded cables are used, grounding and bonding shall be accomplished by methods prescribed by the Engineer.

D. Firestopping: Seal openings around pathway penetrations through fire-rated walls, partitions, floors, and ceilings in accordance with Section 07 84 00.

3.3 INSTALLATION OF CABLING

A. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. At Distribution Frames: 120 inches.

B. Fiber Optic Cabling:
1. Prepare for pulling by cutting outer jacket for 10 inches from end, leaving strength members exposed. Twist strength members together and attach to pulling eye.
2. Support vertical cable at intervals as recommended by manufacturer.
3. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket. Cables with defects shall be replaced.
4. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.
5.

C. Field-Installed Labels: Comply with TIA/EIA-606 using encoded identifiers.
1. Comply with requirements of 27 05 53 - Identification For Communications Systems.
2. Cables: Install color coded labels on both ends.
3. Patch Panels: Label each jack as to its type and function, with a unique numerical identifier.
4. Patch Cords: Label with jack identifier corresponding to initial installation.

3.4 FIELD QUALITY CONTROL

A. Comply with inspection and testing requirements as specified in Section 27 15 55.

B. Visual Inspection:
1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect outlet plates and patch panels for complete labels.

4. Inspect patch cords for complete labels.

C. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

3.5 CLOSEOUT ACTIVITIES

A. See Section 01 70 00 - Execution and Closeout Requirements, for closeout procedures.

B. Project Record Documents: Record actual locations and sizes of pathways, outlets, and jacks.
1. Field Test Reports, one hard copy, one PDF copy and one software based copy (ex.: .FLW).

END OF SECTION

SECTION 27 15 55
COMMUNICATIONS CABLE TESTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Provide all labor, materials, tools, equipment, and field-test instruments required for the complete testing, identification and administration of the work called for in the Contract Documents.

B. To conform to the overall project schedule, the cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.

C. In addition to the tests detailed in this document, the contractor shall notify the Owner or the Owner's representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.

D. Minimum requirements for the test certification, identification and administration of backbone and horizontal optical fiber cabling.
   1. Category 6 Copper Cabling.
   2. Single-Mode Fiber Cabling.

1.2 RELATED REQUIREMENTS

A. Section 27 10 05 - Communications Copper Cabling

B. Section 27 15 23 - Communications Optical Fiber Cabling

1.3 REFERENCE STANDARDS

A. TIA-455-21 - FOTP-21 - Mating Durability of Fiber Optic Interconnecting Devices; 2012.

B. TIA-492AAAA-B - Detail Specification for 62.5-um Core Diameter/125-um Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers; 2009.

C. TIA-492AAAB-A - Detail Specification for 50-um Core Diameter/125-um Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers; 2009.

D. TIA-492CAAA - Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers; 1998 (R 2002).

E. TIA/EIA-568-C.1 - Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements; Rev C, 2012; Addenda 1-7.

F. TIA/EIA-568-C.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components; Rev C, 2012; Addenda 1-11.

G. TIA/EIA-568-C.3 - Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components Standard, and Addendum 1 - Additional Transmission Performance Specifications for 50/125 um Optical Fiber Cables

H. ANSI/TIA/EIA 455 61A, Measurement of Fiber or Cable Attenuation Using an OTDR.

I. ANSI/TIA/EIA-455-59A, Measurement of Fiber Point Discontinuities Using an OTDR.

J. ANSI/TIA/EIA 455 60A, Measurement of Fiber or Cable Length Using an OTDR.

K. ANSI Z136.2, ANS for Safe Use Of Optical Fiber Communication Systems Utilizing Laser Diode And LED Sources.

L. ANSI/TIA/EIA 526 7, Optical Power Loss Measurements of Installed Singlemode Fiber Cable Plant.

M. ANSI/EIA/TIA 455 50B, Light Launch Conditions For Long-Length Graded-Index Optical Fiber Spectral Attenuation Measurements

N. ANSI/TIA 526 14 B, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 edition 2, Fiber Optic Communications Subsystem Test Procedure- Part 4-1: Installed cable plant- Multimode attenuation measurement.

O. TIA/EIA-606 - Administration Standard for the Telecommunications Infrastructure; Rev B, 2012.

1.4 SUBMITTALS

A. Manufacturers catalog sheets and specifications for fiber optic and copper field-test instruments.

B. Sample test reports.

C. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

A. Installer / Tester Qualifications:
   1. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BiCSi or the ACP (Association of Cabling Professionals).
      a. Manufacturer of the copper cable and copper connectors, manufacturer of the fiber optic cable and/or the fiber optic connectors.
      b. Manufacturer of the test equipment used for the field certification.

B. Testing Equipment Qualifications:
   1. Field test instruments shall comply with the accuracy requirements for level III field testers as defined in ANSI/TIA-1152. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table 3 of ANSI/TIA-1152 (Table 3 in this TIA document also specifies the accuracy requirements for the Channel configuration).
   2. Field-test instruments shall have the latest software and firmware installed.
   3. Field-test instruments (tester) shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
   4. The RJ45 test plug shall fall within the values specified in ANSI/TIA-568-C Annex C for NEXT, FEXT and Return Loss.
   5. Testing of the fiber cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m in length. The test cords for OTDR testing shall be approximately 100 m for the launch cable and at least 25 m for the receive cable.
   6. The copper tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To

ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.

7. Field-test instruments (tester) shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
8. Field-test instruments shall have the latest software and firmware installed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 COPPER

A. Every cabling link in the installation shall be tested in accordance with the field test specifications defined in ANSI/TIA-568-C.2 “Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard”. This document will be referred to as the “Category 6 Standard.”

B. Every cabling link in the installation shall be tested for the following:
1. Wire Map
2. Length
3. Insertion Loss
4. NEXT Loss
5. PS NEXT Loss
6. ACR-F Loss
7. PS ACR-F Loss
8. Return Loss
9. Propagation Delay
10. Delay Skew
11. DC Resistance Unbalance.

C. The cable type must be set to match the cable manufacturer and type installed, do not set to the default Cat 6 UTP. If the manufacturer of the cable installed is not listed in the field test equipment, only then, the default Cat 6 UTP may be used.

D. The location of the "Main" shall be at the MDF or IDF and the location of the "Remote" shall be at the outlet. If the location of the "Main" and "Remote" are reversed, it must be noted in the test report documentation for any and all instances.

E. The installed twisted-pair horizontal links shall be tested from the IDF in the telecommunications room to the telecommunication wall outlet in the work area for compliance with the “Permanent Link” performance specification as defined in the Category 6 Standard.

F. One hundred percent of the installed cabling links must pass the requirements of the Category 6 Standard and as further detailed in this Section. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with this Section.

G. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk " * " when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent " * " results shall determine approval or disapproval of

the element under test shall be defined in the relevant detail specification, or agreed on as a part of a contractual specification.

H. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section 4.2.2 of ANSI/TIA-1152). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.

3.2 FIBER

A. Every fiber cable link shall be tested in accordance with this document. This includes testing the attenuation and polarity of the installed cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber end faces shall also be verified.

B. Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

C. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.

D. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

E. Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.

F. Fiber end faces shall be inspected at x200 or x400 magnification. x200 magnification is suitable for inspecting multimode and singlemode fibers. x400 magnification may be used for detailed examination of singlemode fibers. Scratched, pitted or dirty connectors shall be diagnosed and corrected.
   1. End face images shall be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.

G. Testing shall be performed on each cabling segment (connector to connector).

H. Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner’s instructions.

I. Optical loss testing - Horizontal / Backbone link
   1. Multimode links shall be tested at 850 nm and 1300 nm in accordance with ANSI/TIA-526-14-B, one-cord reference method.
   2. Singlemode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper equivalent method.
   3. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

J. OTDR Testing
   1. Fiber links shall be tested at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.
      a. Multimode: 850 nm and 1300 nm
      b. Singlemode: 1310 nm and 1550 nm
   2. Each fiber link and channel shall be tested in both directions.
   3. A launch cable shall be installed between the OTDR and the first link connection.
   4. A receive cable shall be installed after the last link connection.

K. Length Measurement
   1. The length of each fiber shall be recorded.
   2. It is preferable that the optical length be measured using an OLTS or OTDR.

L. Polarity Testing
   1. Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA 568 C.0. The polarity of the paired duplex fibers shall be verified using an OLTS.

3.3 DOCUMENTATION

A. The test results / measurements saved within the field test instrument shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of the test records. A guarantee shall be made that the measurement results are transferred to the PC unaltered, i.e., “as saved in the field test instrument” at the end of each test and that these results cannot be modified at a later time. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.

B. The test results documentation shall be available for inspection by the Owner or the Owner’s representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as built information.

C. The database for the completed job shall be stored and delivered on CD-ROM or DVD prior to Owner acceptance. This CD-ROM or DVD shall include the software tools required to view, inspect, and print any selection of test reports.

D. Circuit IDs reported by the test instrument should match the specified label ID.

E. Detailed test result documentation shall be provided in an electronic data base and shall include the following information for each link:
   1. Identification of the customer site as specified by the owner.
   2. Identification of the link in accordance with the naming convention defined in the overall system documentation.
   3. The name of the test limit selected to execute the stored test results.
   4. The name of the personnel performing the test.
   5. The overall Pass/Fail evaluation of the link-under-test.
      a. Including the NEXT Headroom (overall worst case) number for copper.
      b. Including OLTS and OTDR measurements for fiber.
   6. Identification of the tester interface.
   7. Date and time the test results were saved in the memory of the tester.
   8. The manufacturer, model and serial number of the field-test instrument.
   9. The version of the test software and the version of the test limit database held within the test instrument
   10. Test results information must contain information on each of the required test parameters that are listed in this Section and as further detailed below.

F. Copper
   1. Detailed test results data to be provided in the electronic database for must contain the following information:
      a. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.

1) Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m (1) and the test limit value.
2) Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value.
3) Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value.
4) Insertion Loss (Attenuation): Minimum test results documentation as explained in this Section for the worst pair.
5) Return Loss: Minimum test results documentation as explained in this Section for the worst pair as measured from each end of the link.
6) NEXT, ACR-F: Minimum test results documentation as explained in this Section for the worst pair combination as measured from each end of the link.
7) PS NEXT and PS ACR-F: Minimum test results documentation as explained in this Section for the worst pair as measured from each end of the link.
8) DC Resistance Unbalance.

b. Cable type and the value of NVP used for length calculations.

G. Fiber
1. Detailed test results data to be provided in the electronic database for must contain the following information:
a. The fiber identification number.
b. The length for each optical fiber.
c. The length for each optical fiber as calculated by the OTDR.
d. Test results to include OTDR link and channel traces and event tables at the appropriate wavelength(s).
e. Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
f. End face inspection images.

3.4 FIELD QUALITY CONTROL

A. A representative of the owner shall reserve the right to be invited to witness field testing. The representative shall be notified of the start date of the testing phase five business days before testing commences.

B. A representative of the owner shall reserve the right to select a random sample of 5% of the installed links. The representative (or his / her authorized delegate) shall test these randomly selected links and the results are to be stored in accordance with the prescriptions in this Section. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the end-user representative shall repeat 100% testing and the cost shall be borne by the installation contractor.

END OF SECTION

SECTION 28 31 00
ADDRESSABLE FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION OF WORK:

A. At Homer Intermediate / jr high (IJ) and Homer elementary school, provide complete new fully functioning Fire Alarm System in it's entirety inclusive of all required wiring, conduit, peripherals, digital communicators, power supplies, modules, annunciators, and controls.

B. The new Fire Alarm System specified herein, shall replace an exiting Fire Alarm System.
   1. Proper operation of the existing Fire Alarm System shall be maintained throughout the duration of the project.
   2. Upon installation and final acceptance of new fire alarm system; disconnect and remove all previously existing fire alarm systems in their entirety. Remove and legally dispose of all associated devices, circuitry, controls, and associated components.
   3. Where work is performed in phases, upon installation and final acceptance of the New Fire Alarm System, for a given phase of the work, the existing Fire Alarm System servicing that phase shall be decommissioned. Remove and legally dispose of all associated devices, circuitry, controls, and associated components, related to that phase. The remainder of the existing Fire Alarm System shall be maintained fully functional.

1.2 SECTION INCLUDES:

A. This specification describes an addressable Fire Detection and alarm signaling system. The control panel shall be intelligent device addressable, analog detecting, low voltage and modular, with digital communication techniques, in full compliance with all applicable codes and standards. The features and capacities described in this specification are required as a minimum for this project and shall be furnished by the successful contractor.

B. The system shall be in full compliance with National and Local Codes.

C. The system shall include all required hardware, raceways, interconnecting wiring and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein.

D. All equipment furnished shall be new and the latest state of the art products of a single manufacturer, engaged in the manufacturing and sale of analog fire detection devices for over ten years.

E. The system as specified shall be supplied, installed, tested and approved by the local Authority Having Jurisdiction, and turned over to the owner in an operational condition.

F. In the interest of job coordination and responsibilities the installing contractor shall contract with a single supplier for fire alarm equipment, engineering, programming, inspection and tests, and shall be capable of providing a “UL Listing Certificate” for the complete system.

G. The system specified shall be that which meets the project requirements. Other systems shall be submitted 10 days prior to bid date for approval by the Engineer. All system approved shall meet all the requirements spelled out in this specification. System approval shall be in writing by the Engineer and a copy shall be submitted with the system submittals.

1.3 DEFINITIONS

A. ASME: American Society of Mechanical Engineers

B. FACP: Fire alarm control panel.

C. FM: FM Global (Factory Mutual)

D. Furnish: To supply the stated equipment or materials.

E. Install: To set in position and connect or adjust for use.

F. LED: Light-emitting diode.

G. NCC: Network Command Center

H. NFPA: National Fire Protection Association. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

I. NICET: National Institute for Certification in Engineering Technologies.

J. Provide: To furnish and install the stated equipment or materials.

K. UL: Underwriters Laboratories

1.4 SYSTEM DESCRIPTION

A. The system shall be a complete, electrically supervised fire detection and notification system, with a microprocessor based operating system having the following capabilities, features, and capacities:
   1. Support of mobile test system capable of providing point test reports in NFPA standard format without manual report entries.
   2. System shall provide an output port for monitoring purposes by external systems. Communications to an external system shall be RS-232 or RS-485 communications.
   3. Up to 16 nodes shall be networkable in a peer-to-peer configuration.
   4. Communications between network nodes, each supporting an interactive, self-standing, intelligent local control panel, with system wide display. Any network node shall be capable of supporting a local system with the same capacities and features specified herein.
   5. The local system shall provide status indicators and control switches for all of the following functions:
      a. Audible and visual notification alarm circuit zone control.
      b. Status indicators for sprinkler system water-flow and valve supervisory devices.
      c. Any additional status or control functions as indicated on the drawings, including but not limited to; emergency generator functions, fire pump functions, door unlocking and security with bypass capabilities.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with NFPA 72 and all contract documents and specification requirements.

B. All interconnections between this system and the monitoring system shall be arranged so that the entire system can be UL-Certificated.

C. System shall be a complete, supervised, non-coded, addressable multiplex fire alarm system conforming to NFPA 72.

D. The system shall have Style 4 circuits for each floor. The system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until all initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal.

E. The system shall be capable of the following configurations. Both configurations are permitted on the same network.

1. The system shall support up to 252 addressable devices, which may be divided in any ratio on one, two, three, or four separate, isolated Class B circuits.
2. The system shall support two loops of 252 addressable devices, each of which may be divided in any ratio on one, two, three, or four separate, isolated Class B circuits.

F. The system shall have a built-in digital alarm communication transmitter.

G. The system shall provide an off-normal warning prior to reset for all active devices.

H. The system shall be capable of remote monitoring via a proprietary software system that provides a graphical representation of the fire alarm control panel at a remote PC when connected via Ethernet to the system. The display will show the exact state of the panel, including blinking LEDs, and with menu buttons for control.

I. The system shall be capable of being configured either at the control panel or via a PC Tool.

J. In networked systems, each control panel shall be a global annunciator, capable of viewing all other control panels on the network.

K. The system shall provide the following functions and operating features:
1. The FACP and auxiliary power panels shall provide power, annunciation, supervision and control for the system.
2. Provide Class B initiating device circuits.
3. Provide Style 7 signaling line circuits for the network.
4. Provide two Class B notification appliance circuits. Arrange circuits to allow individual, selective, and visual notification by zone. Notification appliance circuits shall be zoned to correspond with the building fire barriers and other building features.
5. Strobes shall be synchronized throughout the entire building.
6. Provide electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control panel.

L. The system shall provide a field test function where one person can test the complete system or a specific area while maintaining full operational function of other areas not being tested. Alarms, supervisory signals, trouble signals shall be logged on the system printer and in system history during the walk-test.

M. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.

N. Fire alarm signal initiation shall be by one or more of the following devices:
1. Manual pull station
2. Heat detector
3. Addressable area smoke detectors
4. Standard Addressable Duct smoke detector

O. Activation of any system fire, security, supervisory, trouble, or status initiating device shall cause the following actions and indications at all network Person Machine Interfaces using basic graphics and multiple detail screens.
1. Fire Alarm Condition:
   a. Sound an audible alarm and display a custom screen/message defining the building in alarm and the specific alarm point initiating the alarm in a graphic display.
   b. Log into the system history archives all activity pertaining to the alarm condition.
   c. Print alarm condition on system printer.
   d. Sound the ANSI 117-1 signal with synchronized audible notification appliances and synchronized strobes throughout the facility.
   e. Audible signals shall be silenced from the fire alarm control panel by an alarm silence switch. Visual signals shall be programmable to flash until system reset or alarm silencing, as required.
   f. A signal dedicated to sprinkler system water flow alarm shall not be silenced while the sprinkler system is flowing at a rate of flow equal to a single head.

g. Activation of any smoke detector in a single elevator lobby or an elevator equipment room shall, in addition to the actions described, cause the recall of that bank of elevators to the 1st floor and the lockout of controls. In the event of recall initiation by a detector in the first floor lobby, the recall shall be to the alternate floor as determined by the AHJ.
h. Where indicated on drawings heat detectors in elevator shaft and machine rooms shall activate an elevator power shunt trip breaker. The heat detectors shall be rated at a temperature below the ratings of the sprinkler heads in respective locations to insure that the power shall be shut off before activation of sprinkler system.
i. System operated duct detectors as per local requirements shall accomplish HVAC shut down.
j. Door closure devices shall operate by floor or by local requirements.
k. Fire alarm signal to be sent to central station service.

2. Carbon Monoxide Condition:
   a. Sound a distinctive localized alarm from the actual detection device and display a location of event at the addressable fire alarm panel and at the remote annunciators.
   b. Notify personnel in an approved continuously attended supervisory station. Personnel shall then contact the responsible party in accordance with the notification plan per NFPA 720.
3. Supervisory Condition:
   a. Display the origin of the supervisory condition report at the local fire alarm control panel graphic LCD display.
   b. Activate supervisory audible and dedicated visual signal.
   c. Audible signals shall be silenced from the control panel by the supervisory acknowledge switch.
   d. Record within system history the initiating device and time of occurrence of the event.
   e. Print supervisory condition to system printer.
   f. Supervisory signal to be sent to central station service
4. Trouble Condition
   a. Display at the local fire alarm control panel graphic LCD display, the origin of the trouble condition report.
   b. Activate trouble audible and visual signals at the control panel and as indicated on the drawings.
   c. Audible signals shall be silenced from the fire alarm control panel by a trouble acknowledge switch.
   d. Trouble conditions that have been restored to normal shall be automatically removed from the trouble display queue and not require operator intervention. This feature shall be software selectable and shall not preclude the logging of trouble events to the historical file.
   e. Trouble reports for primary system power failure to the master control shall be automatically delayed for a period of time equal to 25% of the system standby battery capacity to eliminate spurious reports as a result of power fluctuations.
   f. Record within system history, the occurrence of the event, the time of occurrence and the device initiating the event.
   g. Print trouble condition to system printer.
   h. Trouble signal to be sent to central station service.

P. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and

accessories. Complete manufacturer's catalog data including supervisory power usage, alarm power usage, physical dimensions, and finish and mounting requirements.

B. Power calculations. Battery capacity calculations. Battery size shall be a minimum of 125% of the calculated requirement. Provide the following supporting information:
   1. Supervisory power requirements for all equipment.
   2. Alarm power requirements for all equipment.
   3. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity.
   4. Voltage drop calculations for wiring runs demonstrating worst-case condition.
   5. NAC circuit design shall incorporate a 15% spare capacity for future expansion.

C. Submit manufacturer's requirements for testing Signaling Line Circuits and device addresses prior to connecting to control panel. At a minimum the following tests shall be required; device address, the usage (Alarm, Supervisory etc), environmental compensation, temperature ratings for thermal detectors and smoke detector sensitivities. This requirement shall need approval before any wiring is connected to the control panel.

D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Wiring Diagrams: For power, signal, and control wiring.
   3. Complete drawings covering the following shall be submitted by the contractor for the proposed system:
      a. Floor plans in a CAD compatible format at a scale of 1/8"=1'-0" showing all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used.
      b. Provide a fire alarm system function matrix as referenced by NFPA 72, Figure A-7-5.2.2 (9). Matrix shall illustrate alarm input/out events in association with initiation devices. Matrix summary shall include system supervisory and trouble output functions. Include any and all departures, exceptions, variances or substitutions from these specifications and/or drawings at time of bid.
   4. Installation drawings shop drawings, and as-built drawings shall be prepared by an individual experienced with the work specified herein.
   5. Incomplete submittals shall be returned without review, unless with prior approval of the Engineer.

E. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
   1. Light fixtures.
   2. HVAC registers
   3. Fire protection equipment interfaces
   4. Special suppression system interfaces

F. Qualification Data: For qualified Installer, Applicator, manufacturer, fabricator, professional engineer, testing agency, and factory-authorized service representative.

G. Source quality-control reports.

H. Field quality-control reports.

I. Operation and Maintenance Data: For all fire alarm equipment, to include in operation and maintenance manuals.

J. Software and Firmware Operational Documentation:
   1. Software operating and upgrade manuals.

2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

K. Warranty: Sample of special warranty.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: The publications listed below form a part of this publication to the extent referenced. The publications are referenced in the text by the basic designation only. The latest version of each listed publication shall be used as a guide unless the authority having jurisdiction has adopted an earlier version.
   1. FM Global (Factory Mutual (FM)):FM Approval Guide
   2. National Fire Protection Association (NFPA)
      a. NFPA 70 National Electrical Code
      b. NFPA 72 National Fire Alarm Code
      c. NFPA 90A Standard For The Installation of Air Conditioning and Ventilating Systems
      d. NFPA 101 Life Safety Code
      e. NFPA 720 Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment
   3. Underwriters' Laboratories, Inc. (UL) equipment standards, Latest Edition
      a. UL Fire Protection Equipment Directory
      b. UL Electrical Construction Materials Directory
      c. UL 38 – Manually Actuated Signaling Boxes for Use With Fire Protection Signaling Systems
      d. UL 228 – Door Holding Devices
      e. UL 268 - Smoke Detectors for Fire Protective Signaling Systems
      f. UL 268A - Smoke Detectors for Duct Application
      g. UL 464 - Audible Signal Appliances
      h. UL 497A – Secondary Protectors for Communications Circuits
      i. UL 521 - Heat Detectors for Fire Protective Signaling Systems
      j. UL 864 - Control Units for Fire Protective Signaling Systems
      k. UL 1283 – Electromagnetic Interference Filters
      l. UL 1449 - Transient Voltage Surge Suppressors
      m. UL 1971 - Signaling Devices for the Hearing Impaired
      n. UL 2075 – Gas and Vapor Detectors and Sensors
   4. International Code Council
      a. International Building Code
      b. International Fire Code.
   5. State and Local Building Codes as adopted and/or amended by The Authority Having Jurisdiction, ADA, and/or State and local equivalency standards as adopted by The Authority Having Jurisdiction.
   6. California State Fire Marshal
   7. NY-MEA
   8. ISO 9002

B. Supplier Qualifications
   1. The manufacturer of the supplied products must utilize multi-channel product distribution on a national basis to be considered for this bid. The manufacturer must have factory branches as well as independent distributors to allow the end user with the ability to utilize factory trained and authorized competitive service providers after system installation and commissioning.
   2. Provide the services of a factory trained and certified representative or technician, experienced in the installation and operation of the type of system provided. The representative shall be licensed in the State if required by law.

3. The technician shall supervise installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The technician shall provide the required instruction to the owner's personnel in the system operation and maintenance.
4. The suppliers shall furnish evidence they have an experienced service organization, which carries a stock of spare and repair parts for the system being furnished.
5. The equipment supplier shall be authorized and trained by the manufacturer to calculate, design, install, test, and maintain the air sampling system and shall be able to produce a certificate stating such upon request.

C. Installer Qualifications:
1. Before commencing work, submit data showing that the manufacturer has successfully installed fire alarm systems of the same scope, type and design as specified.
2. The contractor shall submit copies of all required Licenses and Bonds as required in the State having jurisdiction.
3. The contractor shall employ on staff a minimum of one NICET level II technician or a professional engineer, registered in the State of the installation.
4. The contractor shall be qualified by UL for certifying fire alarm systems.
5. Contractors unable to comply with the provisions of Qualification of Installers shall present proof of engaging the services of a subcontractor qualified to furnish the required services.

D. Source Limitations for fire alarm equipment: Obtain fire alarm equipment from single source.

E. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.
3. Combustion Characteristics: ASTM E 136.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Pre-installation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in original, unopened packages with intact and legible manufacturers’ labels identifying product and manufacturer, date of manufacture, and shelf life if applicable.

B. Store materials inside, under cover, above ground, and kept dry and protected from physical damage until ready for use. Remove from site and discard wet or damaged materials.

1.9 PROJECT CONDITIONS

A. Installed products or materials shall be free from any damage including, but not limited to, physical insult, dirt and debris, moisture, and mold damage.

B. Environmental Limitations: Do not deliver or install products or materials until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire alarm equipment that fail(s) in materials or workmanship within specified warranty period.
   1. Warranty Period: 1 year from date of Substantial Completion.

1.11 SERVICE AGREEMENT

A. Technical Support: Beginning with Substantial Completion, provide software support for 1 year.

B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
   1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Siemens Industry, Building Technologies Division, (or approved equal).

2.2 CONTROL PANEL

A. The fire alarm control panel shall be microprocessor based using multiple microprocessors throughout the system providing rapid processing of smoke detector and other initiation device information to control system output functions.

B. There shall be a watchdog circuit, which shall verify the system processors and the software program. Problems with either the processors or the system program the panel shall activate a trouble signal, and reset the panel.

C. The system modules shall communicate with an RS 485 network communications protocol. All module wiring shall be to terminal blocks, which will plug into the system card cage

D. The system shall be capable of the following configurations. Both configurations are permitted on the same network.
   1. The system shall support two loops of 252 addressable devices, each of which may be divided in any ratio on one, two, three, or four separate, isolated Class B circuits.

E. The system shall be capable of supporting unshielded wiring applications.

F. The system shall be compliant with the requirements of NFPA 720 as a Carbon Monoxide Detection Control Unit and shall meet the UL 2075 listing requirements. All inputs from CO sensors shall be indicated visually and audibly at the control panel. CO sensor inputs shall be distinct and descriptively annunciated from other signals.

G. System Components:
   1. The System Periphery board shall be capable of 252 intelligent devices distributed between one, two, three, or four Class B SLC circuits. Any trouble on one circuit shall not affect the other circuit. This module controls the signaling from the initiation devices reporting alarms and troubles to the control panel. This module shall also provide the signaling to the field devices for the controlling the output of specific initiation devices.

The on board microprocessor provides the periphery board with the ability to function even if the main microprocessor fails. LED's on the board shall provide annunciation for the following; Power, Gnd. Fault, Alarm, Trouble. This board is integral to the system.

2. The system periphery board shall be capable of supporting two system drivers of 252 intelligent devices distributed between one, two, three, or four Class B SLC circuits, for a total panel capacity of 504 addressable devices. Any trouble on one circuit shall not affect the other circuit. This module controls the signaling from the initiation devices reporting alarms and troubles to the control panel. This module shall also provide the signaling to the field devices for the controlling the output of specific initiation devices. The on board microprocessor provides the periphery board with the ability to function even if the main microprocessor fails. LED's on the board shall provide annunciation for the following: Power, Gnd. Fault, Alarm, Trouble. This board is integral to the system.
3. The Signal Line Circuits (SLC) shall be tested for opens, shorts and communications with all addressable devices installed before connection to the control panel. Systems without this capability shall have a test panel installed for initial testing to eliminate any possible damage short term or long term to the control panel. After initial testing replace the test panel and proceed with complete testing.
4. The standard Operator Interface shall have the ability to view events, acknowledge, silence, and reset the system and any networked control panels, when configured as a global PMI.
5. The LED Operator Interface shall have the ability to view events, acknowledge, silence, and reset the system and any networked control panels, when configured as a global PMI. Additionally, the operator interface provides twelve multicolored configurable LEDs for annunciating system status.
6. The Network Card shall provide internode communication between enclosures. Communication shall support Class B Style 4 or Class A Style 7 wiring (in a ring configuration). This card shall plug into the system operator interface.
7. The System Periphery Board shall contain 2 Class B NAC circuits rated at 3 amps each with power-limited outputs. The zones shall be isolated and independently supervised. There shall be at least 6 unique codes/signals for each circuit based on system logic. These signals shall be Temporal Code 3 (Evacuation), Steady (Such as "Recall"), Temporal Code 4 (for CO alarms), March Time 120ppm, March Time 60ppm, and March Time 30ppm. The card shall have the following LED's to provide trouble shooting and annunciation; Power, Gnd. Fault, Zone Activation or Trouble. This functionality shall be integral to the system.
8. The control panel shall be equipped with four Form C relays for alarm, trouble, supervisory, and programmable output. The system shall provide the mounting of all system cards, field wiring, and panel's inter-card wiring. All power limited field wiring shall be separated from all non-power limited internal wiring.

H. System response time from alarm to output shall be an average of three (3) seconds.

I. All system cards and modules shall have Flash memory for downloading the latest module firmware.

J. Passwords:
1. Technician Level Password - There shall be a 5 character password that a user must enter into the control panel in order to perform such maintenance- and control-related functions at the panel as:
   a. Arming and disarming devices.
   b. Activating, deactivating or modifying detector ASD and sensitivity settings.
   c. Activating and deactivating the History Log function, and deleting obsolete entries.
   d. Changing the system time and date.
2. Maintenance Level Password - There shall be a 5 character password that a user must enter into the control panel in order to access the panel's reporting functions and walktest functions.

3. Acknowledge Silenceable Reset Access - There shall be a key required to open a locked cabinet that a system user must use in order to acknowledge events, turn silenceable audibles and visuals on and off, and perform panel resets.

K. Networking:
1. Digital communication capabilities supporting Style 4 (Class B) or Style 7 (Class A) communications using either DC digital or fiber optics technologies or combinations of both as required for the control panel to communicate with up to 16 FACPs.
2. Digital communication capabilities supporting Style 4 (Class B) or Style 7 (Class A) communications using either DC digital or fiber optics technologies or combinations of both as required for the control panel to communicate with up to 4 network nodes.
3. Capability shall exist within the system to extend the network at any node. The system shall support a maximum of two network extension circuits in series on any system branch, extending the inherent distance limitations for network communications.
4. Communication protocol shall be of the RS485 type.

L. Network Fiber Modules
1. Multimode and single mode.
2. The network fiber interface modules shall be used to transmit RS-485 communications between intelligent addressable fire alarm control panels. Each module shall have power, transmit and receive status LEDs. The module can act as a repeater or end-point unit, in a daisy chain or star configuration.
3. The connection between the multimode fiber interface modules shall use 2 high quality duplex 50/125 or 62.5/125 fiber optic cables and ST style fiber connectors. Each segment of the fiber network can be up to 1.9 miles. The fiber module shall have a minimum operating power output budget of -13dB for 62.5/125 cable and -9 dB for 50/125 cable.
4. The connection between the single mode fiber interface modules shall use 2 high quality duplex 9/125 fiber optic cables and ST style fiber connectors. Each segment of the fiber network can be up to 20 miles. The fiber module shall have a minimum operating power output budget of -16dB for 9/125 cable.

M. Degrade Mode Alarm Activation:
1. Each panel shall operate as a stand-alone fire alarm control panel with complete functionality in the event of loss of communications with other panels on a network.

N. Software Modifications: The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made. Systems that require the use of external programmers or change of EPROMs are not acceptable.

O. History: The system shall store 20000 events in history. Trouble warnings will occur when the History buffer is full.

P. Reports:
1. The system shall have the ability to provide configuration, status, queue and history reports.
2. Configuration reports shall provide the following information:
   a. Custom Messages
   b. Database Information
   c. Entity Type
   d. Device Usage
   e. Zone usage
   f. Device Category
   g. Firmware revision
3. Status reports shall provide the following information:
   a. Disarmed cards and devices
   b. ASD settings
   c. Sensitivity in %/foot

d. Alarm threshold in %/foot
e. Temperature in degrees C
f. Walktest

4. Queue reports shall provide the following information:
   a. Alarm events with custom message and event time
   b. Gas alarm events with custom message and event time
   c. Supervisory events with custom message and event time
   d. Trouble events with custom message and event time
   e. Status events with custom message and event time
   f. Information events
5. History reports shall provide Address, History Type, Description, Time & Date and Custom Message. The following event types shall be reported:
   a. Alarm events
   b. Gas alarm events
   c. Supervisory events
   d. Status changes
   e. Alarm verification
   f. Output activation from logic
   g. System Reset
   h. Event Acknowledgements
   i. Block Acknowledgements
   j. Audible Silence System Flag Changes
   k. Sensitivity Changes
   l. Arm / Disarm Commands
   m. Arm / Disarm By Logic
   n. Manual Output Overrides
   o. Output Overrides By Logic
   p. Time Changes
   q. Menu Logins
   r. ASD Changes
   s. Walktest
   t. Device Input to Logic Activations/Deactivations

2.3 POWER SUPPLY

A. The system Power Supply shall be filtered and regulated. The power supply provides power for all system operation, including signaling line circuits, notification appliance circuits, auxiliary power, battery charger, and all optional modules The power supply shall be rated for 120/240 VAC 50/60 Hz.

B. The battery charger shall be able to charge the system batteries up to 100 AH batteries. Battery charging shall be microprocessor controlled and programmed with a special software package to select charging rates and battery sizes. An optional Thermistor for monitoring battery temperature to control charging rate shall be available.

C. Transfer from AC to battery power shall be instantaneous when AC voltage drops to a point where it is not sufficient for normal operation.

2.4 BATTERIES

A. Batteries shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of 24 hours with five (5) minutes of alarm signal at the end this 24-hour period, as required by NFPA 72, Local Systems.

B. CARBON MONOXIDE DETECTION SYSTEM: Batteries shall be dedicated to the Carbon Monoxide Detection System as required by NFPA 720, Secondary Power Supply.

2.5 SYSTEM ENCLOSURE

A. Provide the enclosure needed to hold all the cards and modules as specified with at least spare capacity for two cards. The outer doors shall be capable of being a left hand open. The inner door shall have a left hand opening.

B. Outer Door shall have integral cylinder lock and latch.

2.6 INTELLIGENT INITIATING DEVICES

A. General
1. All initiation devices shall be insensitive to initiating loop polarity. Specifically, the devices shall be insensitive to plus/minus voltage connections.

B. Smoke Detectors – Standard Addressable
1. The detector shall be guaranteed in writing not to false alarm when configured by the factory trained certified technician. The detector must provide up to 11 different environmental algorithms that allow the detector to provide superior false alarm immunity without the need for additional alarm verification delays.
2. The detector shall have a multicolor LED to streamline system maintenance/inspection by plainly indicating detector status as follows: green for normal operation, amber for maintenance required, red for alarm.
3. The multi-criteria smoke detector shall be an intelligent digital photoelectric detector with a programmable heat detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. So as to minimize the effort required by the installing and maintenance technician to appropriately configure the detector to ensure optimal system design, the detectors shall be programmable as application specific. Application settings shall be selected in software for a minimum of eleven environmental fire profiles unique to the devices installed location.
4. The detector shall be designed to eliminate the possibility of false indications caused by dust, moisture, RFI/EMI, chemical fumes and air movement while factoring in conditions of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm condition report.
5. The intelligent smoke detector shall be capable of providing three distinct outputs from the control panel. The outputs shall be from an input of smoke obscuration, a thermal condition or a combination of obscuration and thermal conditions. The detector shall be designed to eliminate calibration errors associated with field cleaning of the chamber.
6. The detector shall support the use of a relay, or LED remote indicator without requiring an additional software address. Low profile, white case shall not exceed 2.5 inches of extension below the finish ceiling.
7. For the detector where required, there shall be available a locking kit and detector guard to prevent unauthorized detector removal.
8. Where required, there shall be available a programmable remote lamp configurable to remotely duplicate the on-board LED status of another system device with the same software address.

C. Heat Detectors – Addressable
1. Thermal Detectors shall be rated at 135 degrees fixed temperature and 15 degrees per minute rate of rise. Detectors shall be constructed to compensate for the thermal lag inherent in conventional type detectors due to the thermal mass, and alarm at the set point of 135 degrees Fahrenheit. The choice of alarm reporting as a fixed temperature detector or a combination of fixed and rate of rise shall be made in system software and be changeable at any time without the necessity of hardware replacement.

2. The detectors furnished shall have a listed spacing for coverage up to 2,500 square feet and shall be installed according to the requirements of NFPA 72 for open area coverage.
3. Heat detector shall have the following temperature settings:
   a. Fixed temperature at 135°F, 145°F, 155°F, 165°F, 174°F
   b. Rate of Rise at 15°F/ min (8.3°C) at 135°F (57°C)
   c. Rate of Rise at 15°F/ min (8.3°C) at 174°F (79°C)
   d. Low temperature warning at 40°F (4.4°C)

D. Duct Smoke Detectors – Addressable
1. For duct detector applications, the smoke detector shall be an intelligent digital photoelectric detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes.
2. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. The detector shall be mounted in a duct detector housing listed for that purpose. The duct detector shall support the use of a remote test switch, relay or LED remote indicator. The duct detector shall be supplied with the appropriate sampling tubes to fit the installation.
3. Where duct detectors are exposed to the weather a weatherproof enclosure shall be available. The duct housing cover shall include a test port for functional testing of the detector without cover removal. The duct housing shall include a cover removal switch capable of indicating cover removal status to the fire alarm control panel.
4. Where required there shall be available a duct housing with an on-board relay. Also where required, there shall be a standalone housing available with its own power supply and test/reset switch that does not require connection to a fire alarm control panel.
5. Duct smoke detector housing shall allow use in duct systems with air velocity ranging from 100 to 4,000 feet per minute, within temperature ranges of 32°F to 120°F per minute, and with relative humidity ranging from 0 to 95%.
6. Duct Housings and Accessories:
   a. Global Air Duct Housing for Conventional and Addressable Detectors
   b. Global Air Duct Housing for Addressable P2 Detectors with Relay Application
   c. Global Air Duct Housing for Conventional Detectors with Relay Application
   d. Global Air Duct Housing for Conventional Detectors with Relay Application and Built-in Power Source
   e. Weather-Proof housing to accommodate all versions of Global Air Duct Housings
   f. Remote Test Lamp for Conventional Detectors

E. Detector Bases – Addressable
1. Detector bases shall be low profile twist lock type with screw clamp terminals and self-wiping contacts. Bases shall be installed on an industry standard, 4" square or octagonal electrical outlet box.
2. Detectors shall be listed per UL 268A as “direct in duct” without need for a duct housing.
3. Multi-Criteria Fire Detector shall be listed as providing CO detection in duct application.

F. Manual Pull Stations – Addressable
1. Provide addressable manual stations where shown on the drawings, to be flush or surface mounted as required. Manual stations shall contain the intelligence for reporting address, identity, alarm and trouble to the fire alarm control panel. The manual station communications shall allow the station to provide alarm input to the system and alarm output from the system within less than four (4) seconds.
2. The manual station shall be equipped with terminal strip and pressure style screw terminals for the connection of field wiring. Surface mounted stations where indicated on the drawings shall be mounted using a manufacturer's prescribed matching red enamel outlet box.
3. Provide double action pull station.

4. Where required, there shall also be available pull stations with break glass, capable of explosion proof installation, capable of weatherproof installation, reset key operation, and metal housings.

G. Addressable Interface Devices
1. Addressable Interface Devices shall be provided to monitor contacts for such items as water-flow, tamper, and PIV switches connected to the fire alarm system. These interface devices shall be able to monitor a single or dual contacts. An address will be provided for each contact. Where remote supervised relay is required the interface shall be equipped with a SPDT relay rated for 4 amps resistive and 3.5 amps inductive.
2. Where needed a Conventional Zone Module shall connect to the Signal Line Circuit, which will allow the use of conventional initiation devices. This module shall have the ability to support up to 15 convention smoke detectors and an unlimited number of contact devices. This module shall also be capable of monitoring Linear Beam detectors and conventional Flame detectors. Where required, there shall be an intrinsically safe detection solution for NEMA defined intrinsically safe installations compatible with the conventional zone module.
3. Single Device Damper Monitoring and Control: A single switch input shall be able to monitor all 3 states of a damper – open, closed, and in transit. A single device shall be able to fully control a damper (through the relay connected to the motor control) while also using its switch input for monitoring all 3 states of the damper.
4. Addressable input/output module shall be insensitive to polarity and shall have capability for up to 4 separate inputs (Class B) or 2 separate Class A inputs and 4 separate outputs (Class B).

2.7 DEVICE PROGRAMMING UNIT

A. Device Programming Unit: The programming tool shall program the intelligent devices with addresses. The unit shall test the device to respond to its address. DIP switches and rotary switches shall not be acceptable. The programmer shall have a carrying case.

2.8 NOTIFICATION APPLIANCES

A. Strobes: Siemens True Alert, (or approved equal).
1. The strobes shall meet and be listed for UL Standard 1971 (Emergency Devices for the Hearing-Impaired) for Indoor Fire Protection Service
2. Strobe shall be listed for indoor use, and shall meet the requirements of FCC Part 15 Class B
3. Strobe appliances shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range, and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens
4. All inputs shall be compatible with standard, reverse polarity supervision of circuit wiring by a Fire-Alarm Control Panel (FACP)
5. The Strobe shall be of low-current design
6. The strobe intensity shall have field-selectable settings, and shall be rated per UL Standard 1971 for 15/30/75/95cd or 115/177cd for ceiling mount where Multi-Candela appliances are specified
7. The selector switch for selecting the candela shall be tamper resistant
8. The appliance shall be compatible with sync modules or strobe power panel supply with built-in sync protocol when synchronization is required
9. The strobes shall not drift out of synchronization at any time during operation
10. If the sync module or Power Supply fails to operate, (i.e. - contacts remain closed), the strobe shall revert to a non-synchronized flash rate
11. The strobes shall be designed for indoor surface or flush mounting
12. The Strobe Appliances shall incorporate a Patented, Integral Strobe Mounting Plate that shall allow mounting to single-gang, double-gang, 4-inch square, 100mm European type back boxes, or the surface back box

13. The Multi-Candela or Single-Candela Strobe Plate shall mount to either a standard, 4-inch square back box for flush mounting, or shall mount to a box for surface mounting
14. All notification appliances shall be backward compatible

B. Speaker and Speaker Strobe Appliances
1. Speaker Strobe and standalone Speaker Appliances shall meet and be listed for UL 1480.
2. Speaker shall operate on a standard 25VRMS or 70.7VRMS NAC using twisted / shielded wire.
3. Speaker shall have the following taps: 0.25W, 0.50W, 1.0W and 2.0W.
4. The speaker frequency shall be 400Hz to 4000Hz for fire alarm, and 125Hz to 12kHz for general signaling.
5. The speaker shall install directly to a 4" square, 1-1/2" deep box with 1-1/2" extension.
6. Strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Input Voltage Range, and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens.
7. Strobe intensity, where Multi-Candela appliances are specified, shall have field-selectable settings, and shall be rated per UL Standard 1971 for:
   a. 15/30/75/110cd
   b. 135/185cd
8. The selector switch for selecting the candela setting shall be tamper resistant.
9. The appliance, when synchronization is required, shall be compatible with sync modules or Power Supplies with built-in Sync Protocol.
10. The strobes shall not drift out of synchronization at any time during operation.
11. The strobes shall revert to a non-synchronized flash-rate, if the sync module or Power Supply should fail to operate (i.e. – contacts remain closed).
12. All notification appliances shall listed for Special Applications:
    a. Strobes are designed to flash at 1-flash-per-second minimum over their “Regulated Input Voltage Range”.
13. All candela ratings represent minimum-effective Strobe intensity, based on UL Standard 1971.

2.9 DIGITAL COMMUNICATOR

A. The Multi-Point Digital Alarm Communicator shall be UL864 listed to provide point identification of alarm, supervisory, security and trouble events to a Central or Remove Receiving Station. The DACT shall support the following:
1. Ademco Contact ID or SIA protocol
2. Ademco Contact ID selection shall provide the ability to transmit events for up to 999 individual zones
3. SIA selection shall provide the ability to transmit events for up to 10000 individual points
4. Programming of accounts and phone numbers
5. Dual phone line interface
6. Line fault monitoring.
7. Automatic 24-hour test
8. The DACT supports configurable alarm, alarm restoral, trouble, trouble restoral, supervisory, supervisory restoral, and reset events.
9. The DACT supports Ademco Contact ID alarm event codes for general alarm, smoke detector alarm, waterflow alarm, duct alarm, and manual alarm events.
10. The DACT shall communicate to a Central or Remote Receiving Station upon a carbon monoxide detection event per NFPA 720.
11. Optionally, the DACT can be programmed to report events by event queue only.

2.10 REMOTE ANNUNCIATOR

A. The fire-system displays are remote LCD units that show existing status of the FACP.

B. The display supports the following LED's for system-status conditions:
   1. Power
   2. Alarm
   3. Trouble
   4. Supervisory
   5. Ground-Fault

C. A 3.5 inch by 1.5 inch LED screen will give details of the event in alphanumeric form. The display screen shall scroll to reveal additional events.

D. Graphic Display:
   1. UV fade-resistant inks with unlimited color selection.
   2. Heavy-duty aluminum anodized frame.
   3. Security mounting hardware.
   4. Polycarbonate clear protective window.
   5. Approximately 24" x 18".

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION - PHASED INSTALLATIONS

A. Where the Work is to be completed in phases, the requirements of this section shall apply fully to each individual phase.

3.3 INSTALLATION

A. Perform work in accordance with the requirements of NFPA 70, NFPA 72 and NECA 1-2006, Standard of Good Workmanship in Electrical Contracting.

B. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.

C. In the event that limited energy cable installation is allowed, all cable runs shall be run at right angles to building walls, supported from structure at intervals not exceeding 3 feet and where installed in environmental air plenums, be rated for such use and tied/supported by components listed for environmental air plenums installation.

D. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

E. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

F. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

G. Provide primary power for each panel from normal/ emergency panels as indicated on the Electrical Power Plans. Power shall be 120 VAC service, transformed through a two-winding, isolation type transformer and rectified to low voltage DC for operation of all circuits and devices.

3.4 BOXES, ENCLOSURES AND WIRING DEVICES

A. Boxes shall be installed plumb and firmly in position.

B. Extension rings with blank covers shall be installed on junction boxes where required.

C. Junction boxes served by concealed conduit shall be flush mounted.

D. Upon initial installation, all wiring outlets, junction, pull and outlet boxes shall have dust covers installed. Dust covers shall not be removed until wiring installation when permanent dust covers or devices are installed.

E. "Fire alarm system" decal or silk-screened label shall be applied to all junction box covers.

3.5 DEVICE PROTECTIVE GUARDS

A. Protective guards shall be installed on detectors, A/V units, and manual pull stations in any space subject to abuse.
   1. These spaces include but are not limited to:
      a. Gymnasiums
      b. Fitness/ Weight Rooms
      c. Cafeteria
      d. Locker Rooms

B. Detector Guards:
   1. 9 gauge steel wire with polyester coating.
   2. In Cafeterias and Fitness Rooms, the guard shall be spray painted to match the ceiling finish. Coordinate with Architect for RAL#.
   3. STI-9601, or approved equal.

C. A/V Guards:
   1. 9 gauge steel wire with polyester coating.
   2. Color shall be red.
   3. STI-97 Series, or approved equal.

D. Pull Station Guards:
   1. Clear polycarbonate hinged cover.
   2. Red Label: "In case of fire, lift cover."
   3. Provide spacer in surface mount applications.
   4. STI-1200, or approved equal.

3.6 CONDUCTORS

A. Each conductor shall be identified as shown on the drawings at each with wire markers at terminal points. Attach permanent wire markers within 2 inches of the wire termination. Marker legends shall be visible.

B. All wiring shall be supplied and installed in compliance with the requirements of the National Electric Code, NFPA 70, Article 760, and that of the manufacturer.

C. Wiring for strobe and audible circuits shall be a minimum 14 AWG, signal line circuits minimum 18 AWG twisted.

D. All splices shall be made using solderless connectors. All connectors shall be installed in conformance with the manufacturer recommendations.

E. Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.

F. The installation contractor shall submit for approval prior to installation of wire, a proposed color code for system conductors to allow rapid identification of circuit types.

G. Wiring within sub panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

3.7 DEVICES

A. Relays and other devices to be mounted in auxiliary panels are to be securely fastened to avoid false indications and failures due to shock or vibration.

B. Wiring within panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

C. All devices and appliances shall be mounted to or in an approved electrical box.

3.8 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Permanently label or mark each conductor at both ends with permanent alphanumeric wire markers.

C. A consistent color code for fire alarm system conductors throughout the installation.

3.9 ADDITIONAL COMPONENTS

A. Furnish extra materials that are to be included in the contractors bid. These extra materials are to be installed at locations directed by the engineer or CM. The quanties indicated are for EACH building.
   1. Provide labor and materials to provide (15) additional Ionization Area Smoke Detectors and 250 linear feet of fire alarm circuitry.
   2. Provide labor and materials to provide (10) additional Duct Smoke Detectors, 250 linear feet of fire alarm circuitry.
   3. Provide labor and materials to provide (5) additional Rate of Rise Temperature Heat Detectors and 250 linear feet of fire alarm circuitry.
   4. Provide labor and materials to provide (10) additional manual pull stations and 250 linear feet of fire alarm circuitry.
   5. Provide labor and materials to provide (10) additional speaker strobe units and 250 linear feet of fire alarm circuitry.
   6. Provide labor and materials to provide (10) additional connections to fire / smoke dampers and 250 linear feet of fire alarm circuitry.

3.10 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Testing General:
   1. All Alarm Initiating Devices shall be observed and logged for correct zone and sensitivity. These devices and their bases shall be tagged with adhesive tags located in an area not visible when installed, showing the initials of the installing technician and date.

2. Wiring runs shall be tested for continuity, short circuits and grounds before system is energized. Resistance, current and voltage readings shall be made as work progresses.
3. The acceptance inspector shall be notified before the start of the required tests. All items found at variance with the drawings or this specification during testing or inspection by the acceptance inspector shall be corrected.
4. Test reports shall be delivered to the acceptance inspector as completed.
5. All test equipment, instruments, tools and labor required to conduct the system tests shall be made available by the installing contractor. The following equipment shall be a minimum for conducting the tests:
   a. Ladders and scaffolds as required to access all installed equipment.
   b. Multi-meter for reading voltage, current and resistance.
   c. Two way radios, and flashlights.
   d. A manufacturer recommended device for measuring air flow through air duct smoke detector sampling assemblies.
   e. Decibel meter.
   f. In addition to the testing specified to be performed by the installing contractor, the installation shall be subject to test by the acceptance inspector.

3.11 ACCEPTANCE TESTING

A. A written acceptance test procedure (ATP) for testing the fire alarm system components and installation will be prepared by the engineer in accordance with NFPA 72 and this specification. The contractor shall be responsible for the performance of the ATP, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and programming.

B. A program matrix shall be prepared by the installing contractor referencing each alarm input to every output function affected as a result of an alarm condition on that input.

C. The installing contractor prior to the ATP shall prepare a complete listing of all device labels for alphanumeric annunciator displays.

D. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests shall be witnessed by the owner and test results recorded for use at the final acceptance test.

E. Preliminary Testing: Conduct preliminary tests to ensure that all devices and circuits are functioning properly. After preliminary testing is complete, provide a letter certifying that the installation is complete and fully operable. The letter shall state that each initiating and indicating device was tested in place and functioned properly. The letter shall also state that all panel functions were tested and operated properly. The Contractor and an authorized representative from each supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.

F. Final Acceptance Test: Notify the owner in writing when the system is ready for final acceptance testing. Submit request for test at least 14 calendar days prior to the test date. A final acceptance test will not be scheduled until megger test results, the loop resistance test results, and the submittals required in Part 1 are provided to the owner. Test the system in accordance with the procedures outlined in NFPA 72.
   1. Verify that the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
   2. Test each initiating and indicating device and circuit for proper operation and response. Disconnect the confirmation feature for smoke detectors during tests to minimize the amount of smoke or test gas needed to activate the detector.
   3. Test the system for all specified functions in accordance with the contract drawings and specifications and the manufacturer's operating and maintenance manual.
   4. Visually inspect all wiring.

5. Verify that all software control and data files have been entered or programmed into the FACP.
6. Verify that Shop Drawings reflecting as-built conditions are accurate.
7. Measure the current in circuits to assure that there is the calculated spare capacity for the circuits.
8. Measure voltage readings for circuits to assure that voltage drop is not excessive.
9. Measure the voltage drop at the most remote appliance on each notification appliance circuit.

G. The acceptance inspector shall use the system record drawings in combination with the documents specified in this specification during the testing procedure to verify operation as programmed. In conducting the ATP, the acceptance inspector shall request demonstration of any or all input and output functions. The items tested shall include but not be limited to the following:
   1. System wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:
      a. Open, shorted and grounded signal line circuits.
      b. Open, shorted and grounded notification, releasing circuits.
      c. Primary power or battery disconnected.
   2. System notification appliances shall be demonstrated as follows:
      a. All alarm notification appliances actuate as programmed
      b. Audibility and visibility at required levels.
   3. System indications shall be demonstrated as follows:
      a. Correct message display for each alarm input at the control display.
      b. Correct annunciator light for each alarm input at each annunciator and graphic display as shown on the drawings.
      c. Correct history logging for all system activity.
   4. System off-site reporting functions shall be demonstrated as follows:
      a. Correct zone transmitted for each alarm input
      b. Trouble signals received for disconnect
   5. Secondary power capabilities shall be demonstrated as follows:
      a. System primary power shall be disconnected for a period of time as specified herein. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period as specified.
      b. System primary power shall be restored for forty-eight hours and system-charging current shall be normal trickle charge for a fully charged battery bank.
      c. System battery voltages and charging currents shall be checked at the fire alarm control panel.

3.12 DOCUMENTATION

A. System documentation shall be furnished to the owner and shall include but not be limited to the following:
   1. System record drawings and wiring details including one set of reproducible drawings, and a CD ROM with copies of the record drawings in DXF format for use in a CAD drafting program.
   2. System operation, installation and maintenance manuals.
   3. System matrix showing interaction of all input signals with output commands.
   4. Documentation of system voltage, current and resistance readings taken during the installation, testing and ATP phases of the system installation.
   5. System program showing system functions, controls and labeling of equipment and devices.

3.13 PROTECTION

A. Remove and replace devices and panel components that are wet, moisture damaged, or mold damaged.

3.14 DEMONSTRATION

A. Instructor: Include in the project the services of an instructor, who shall have received specific training from the manufacturer for the training of other persons regarding the inspection, testing and maintenance of the system provided. The instructor shall train the employees designated by the owner, in the care, adjustment, maintenance, and operation of the fire alarm system. Provide sign-in sheet listing Owner's staff present at each training session.

B. Training sessions shall cover all aspects of system performance, including system architecture, signaling line circuit configurations, sensor and other initiating device types, locations, and addresses, fire alarm control panel function key operation, and other functions as designated by the owner.

C. Required Instruction Time: Provide 16 hours of instruction after final acceptance of the system. The instruction shall be given during regular working hours on such dates and times as are selected by the owner. The instruction may be divided into two or more periods at the discretion of the owner. One training session shall be videotaped by the contractor. Videotapes shall be delivered to the owner.

D. Provide a typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the FACP. The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory and trouble. The instructions shall be approved by the owner.

E. Comprehensive system troubleshooting training shall be provided for a single individual designated by the owner. This session shall be separate and distinct from the above described sessions.

F. All training sessions shall be conducted following final system certification and acceptance. Three additional training sessions shall be provided for all security personnel on all shifts six months after final system certification.

G. All training sessions shall be conducted by an authorized fire alarm system distributor representative, who has received specific training from the manufacturer for the training of other persons regarding the inspection, testing, and maintenance of the system provided.

3.15 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
   1. Be prepared to conduct any of the required tests.
   2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
   3. Have authorized technical representative of control unit manufacturer present during demonstration.
   4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
   5. Repeat demonstration until successful.

B. Occupancy of the project will not occur prior to Substantial Completion.

C. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:

1. Specified diagnostic period without malfunction has been completed.
2. Approved operating and maintenance data has been delivered.
3. Spare parts, extra materials, and tools have been delivered.
4. All aspects of operation have been demonstrated to Owner.
5. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
6. Occupancy permit has been granted.
7. Specified pre-closeout instruction is complete.

D. Perform post-occupancy instruction within 3 months after Substantial Completion.

3.16 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service

B. Provide to Owner, at no extra cost, a written maintenance contract for entire manufacturer's warranty period, to include the work described below.

C. Provide to Owner, a proposal as an alternate to the base bid, for a maintenance contract for entire warranty period, to include the work described below; include the total cost of the contract, proposal to be valid at least until 30 days after date of Substantial Completion.

D. Perform routine inspection, testing, and preventative maintenance required by NFPA 72, including:
1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
3. Record keeping required by NFPA 72 and authorities having jurisdiction.

E. Provide trouble call-back service upon notification by Owner:
1. Provide on-site response within 2 hours of notification.
2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

F. Provide a complete description of preventative maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

G. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.

H. Comply with Owner's requirements for access to facility and security.

END OF SECTION

SECTION 31 05 13
SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Subsoil materials.

B. Topsoil materials.

1.2 RELATED REQUIREMENTS:

A. Section 31 05 16 - Aggregates for Earthwork.

B. Section 31 22 00 - Grading.

C. Section 31 23 16 - Excavation.

D. Section 31 23 16.13 - Trenching.

E. Section 31 23 23 - Fill.

F. Section 32 92 19 - Seeding.

G. Section 32 93 00 - Plants.

1.3 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017.

D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

1.4 SUBMITTALS

A. Section 01 30 00 - Administrative Requirements: Submittal Procedures

B. Samples: Submit, in air-tight containers, 10 lbs sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of imported materials source.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Furnish each subsoil and topsoil material from a single source throughout the Work.

B. Perform Work in accordance with Department of Transportation Standards in the State of New York.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

A. Excavated and re-used material or imported select borrow.

B. Graded.

C. Free of lumps larger than 3 inch, rocks larger than 2 inch, and debris.

D. Conforming to ASTM D 2487.

2.2 TOPSOIL MATERIALS

A. On-site Topsoil:
   1. Excavated and re-used material.
   2. Graded.
   3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
      a. Screening: Single screened.
   4. Conforming to ASTM D 2487.

B. Imported Topsoil
   1. Imported borrow.
   2. Friable loam.
   3. Reasonably free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
      a. Screening: Double screened.
   4. Acidity range (pH) of 5.5 to 7.5
   5. Containing minimum of 4 percent and maximum of 25 percent organic matter.
   6. Conforming to ASTM D 2487.
   7. Limit decaying matter to 5 percent of total content by volume.

2.3 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and analysis of soil material.

B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D 698, ASTM D 1557, and AASHTO T 180.

C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D 698, ASTM D 1557, and AASHTO T 180.

D. When tests indicate materials do not meet specified requirements, change material and retest.

E. Furnish materials of each type from the same source throughout the Work.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.

B. Stockpile excavated material meeting requirements for subsoil and topsoil materials.

C. Remove excess excavated materials, subsoil, and topsoil not intended for reuse from site.

D. Remove excavated materials not meeting requirements for subsoil and topsoil materials from site.

3.2 STOCKPILING

A. Stockpile materials on site as designated by Architect.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Stockpile topsoil 8 feet high maximum.

E. Prevent intermixing of soil types or contamination.

F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

G. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 05 16
AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coarse aggregate materials.

B. Fine aggregate materials.

C. Blended aggregate materials.

1.2 RELATED REQUIREMENTS

A. Section 31 05 13 - Soils for Earthwork.

B. Section 31 22 00 - Grading.

C. Section 31 23 16 - Excavation.

D. Seion 31 23 16.13 - Trenching.

E. Section 31 23 23 - Fill.

1.3 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.

B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

D. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017, with Editorial Revision (2018).

E. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

1.4 SUBMITTALS

A. Section 01 30 00 - Administrative Requirements: Submittal Procedures.

B. Samples: Submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of imported materials suppliers.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Furnish each aggregate material from a single source throughout the Work.

B. Perform Work in accordance with NYSDOT standards.

PART 2 PRODUCTS

2.1 COURSE AGGREGATE MATERIALS

A. CRUSHED STONE
1. Crushed stone shall be a mixture of 50% No. 1 & 2 crushed stone meeting all requirements in Section 703-02 of the NYSDOT Standard Specification.

B. GRANULAR FILL
1. Granular fill shall meet all requirements specified for Type 4 Subbase in Section 304-2.02 of the NYSDOT Standard Specification.

C. GRAVEL (STRUCTURAL) FILL
1. Structural fill shall meet all requirements for Type 2 Subbase in Section 304 of the NYSDOT Standard Specification (Pay Item No. 302.12). Material to conisist of crushed ledgestone as indicated in NYSDOT.

2.2 FINE AGGREGATE MATERIALS

A. CUSHION SAND
Cushion sand shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances. It shall meet the following gradation requirements and shall be approved by the Engineer before use.

Sieve Size	Percent Passing by Weight
1/4 inch	100
No. 50	0-35
No. 100	0-10

B. PEA STONE
1. Stone meeting all requirements in Section 605-2.02 of the NYSDOT Standard Specification; free of shale, clay, friable material and debris.
2. Pea stone shall consist of clean, durable rock of uniform quality.

Sieve Size	Percent Passing by Weight
1 inch	100
1/2 inch	30-100
1/4 inch	0-30
No. 10	0-10
No. 20	0-5

2.3 BLENDED AGGREGATE MATERIAL

A. CRUSHER RUN
1. Crusher run shall meet all requirements for Type 2 subbase in Section 304-2.02 of the NYSDOT Standard Specification.

B. SELECT NATIVE FILL
General: On-site material shall be considered select fill if it is free from organic materials and debris, meets the following gradation and soundness requirements, and is approved by the Architect.

Sieve Size Percent Passing by Weight

4 inch	100
No. 40	0-70
No. 200	0-15

Soundness: Less than 30 percent magnesium sulfate soundness loss.

C. UNCLASSIFIED FILL

On-site material used as unclassified fill shall be free of stones larger than 8 inches in the largest dimension, shall be free of organic materials and debris, and shall be approved by the Architect.

2.4 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and inspection services.

B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D 698, ASTM D 1557, ASTM D 4318, ASTM C 136, and AASHTO T 180.

C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D698, ASTM D 1557, ASTM D 4318, ASTM C 136, and AASHTO T 180.

D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate aggregate materials from on-site locations as indicated on drawings or designated by Architect as specified in Section 31 23 16 - Excavation.

B. Stockpile excavated material meeting requirements for coarse aggregate and fine aggregate materials.

C. Remove excess excavated, coarse aggregate, and fine aggregate materials not intended for reuse from site.

D. Remove excavated materials not meeting requirements for coarse aggregate and fine aggregate materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations indicated or designated by Architect.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

E. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal or protection of designated trees, shrubs, and other plant life.

B. Removal of existing surface debris.

C. Removing designated paving, curbs.

D. Demolition and removal of above grade improvements.

E. Disconnecting, capping or sealing, and removal/abandoned utilities.

F. Excavating of subsoil and topsoil.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 57 13 - Temporary Erosion and Sediment Control.

C. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.

D. Section 31 22 00 - Grading: Topsoil removal.

E. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

F. Section 32 93 00 - Plants: Pruning of existing trees to remain.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in locations indicated.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

B. Historical items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be encountered during demolition, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

C. The Contractor is responsible for cutting all marked trees to log length and stock piling the logs for the property owner on site at property owners designated location.

1.5 PROJECT CONDITIONS

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
   1. Protect improvements on adjoining properties and on Owner's property.
   2. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to remain at drip line.

D. Salvageable Improvements: Carefully remove items indicated to be salvaged, and store on Owner's premises where indicated or directed.

E. If indicated, Buildings to be demolished or relocated will be vacated and their use discontinued before start of Work.

F. If indicated, Owner assumes no responsibility for actual condition of buildings to be demolished or relocated.

G. Owner will maintain conditions existing at time of inspection for bidding purpose as far as practical.

H. Storage or sale of removed items or materials on-site will not be permitted.

I. Explosives: Use of explosives will not be permitted.

1.6 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Areas for temporary construction and field offices.

C. Schedule of demolition activities indicating the following:
   1. The Owner reserves the right to claim any material scheduled for demolition. No demolition materials are to be removed from job site without approval of the Construction Manager.
   2. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
   3. Dates for shutoff, capping, and continuation of utility services.

D. Inventory of items to be removed and salvaged.

E. Inventory of items to be removed by Owner.

F. Photographs and videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by demolition operations.

G. Record drawings at Project closeout according to Division 1 Section "Contract Closeout."

1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.7 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Clearing Firm: Company specializing in the type of work required.
1. Minimum of 3 years of documented experience.

1.8 SCHEDULING

A. Arrange demolition schedule so as not to interfere with Owner's on-site operations.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 31 23 23 - Fill and Backfill.

B. Herbicides: Not allowed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify existing plant life designated to remain is tagged or identified.

C. Identify salvage area for placing removed materials.

D. Verify that utilities have been disconnected and capped.

E. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.

F. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

G. Survey the condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition or relocation.

H. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.2 INITIAL PREPARATION

A. Call Local Utility One Call Center @ 811in the State of New York, not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

A. Locate, identify, and protect utilities indicated to remain, from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping as specified in Section 01 50 00 - Temporary Facilities and Controls.

C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 UTILITY SERVICES

A. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

B. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.

C. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.

D. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving structures to be demolished.

E. Owner will arrange to shut off indicated utilities when requested by Contractor.

F. Utility Requirements: Refer applicable specification sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.5 PREPARATION

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

C. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

D. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.

E. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

F. Protect existing site improvements, appurtenances, and landscaping to remain.

G. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings to be demolished or related and adjacent buildings to remain.

H. Strengthen or add new supports when required.

3.6 POLLUTION CONTROLS

A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.

B. Do not create hazardous or objectionable conditions, such as ice, flooding, and pollution, when using water.

C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

D. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.

E. Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before start of demolition.

3.7 CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. “Removal” includes digging out and off-site disposing of stumps, roots, and branches.

B. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

C. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over ½" inch in diameter, and without weeds, roots, and other objectionable material.

D. Do not remove wet topsoil.

E. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
   1. Do not remove topsoil from site.

F. Remove heavy growths of grass from areas before stripping.

G. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

H. Stockpile topsoil in storage piles. Construct storage piles on site to a depth not exceeding 8 feet and protect from erosion. Cover storage piles, if required, to prevent wind erosion.

I. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

J. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

K. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

L. Clear areas required for access to site and execution of Work to minimum depth of 12 inches.

M. Clear undergrowth and deadwood, without disturbing subsoils.

N. Removed timber and stumps that are unwanted by the Owner or landowner shall be properly disposed of.

3.8 REMOVAL

A. Remove debris, rock, and extracted plant life from site.

B. Remove paving, walks and curbs as indicated on Drawings. Neatly saw cut edges at right angle to surface and at right angles to adjoining structures. Saw cut concrete pavement as indicated at locations shown on drawings nearest to existing joint.

C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.

D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

E. Do not burn or bury materials on site. Leave site in clean condition.

3.9 DEMOLITION

A. Building Demolition: Demolish buildings completely and remove all building debris from the site. Use methods required to complete Work within limitations of governing regulations and as follows:

B. Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

C. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.

D. Demolish concrete and masonry in small sections.

E. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

F. Break up and remove concrete slab on grade, unless or shown to remain on drawings.

G. Below-Grade Construction: Demolish foundation walls and other below-grade construction.

H. Unless directed otherwise completely remove below-grade construction, including foundation walls and footings, and concrete slabs.

I. Break up and remove below-grade concrete slabs, unless indicated to remain.

J. Filling Below-Grade Areas: Completely fill below-grade areas and voids resulting from demolition of buildings and pavements with soil materials as required.

K. Damages: Promptly repair damages to adjacent facilities caused by demolition operations.

3.10 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.11 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.

B. Do not remove or damage vegetation beyond the limits indicated on drawings.
   1. Exception: Specific trees and vegetation indicated on drawings to be removed.

C. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.
   2. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
   3. Around other vegetation to remain within vegetation removal limits.

D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.

F. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.12 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of topsoil.

B. Removal of subsoil.

C. Rough grading cutting, filling, rough contouring, compacting, and finished grading the site for site structures, building pads, and trenches.

D. Finish grading.

1.2 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Section 31 05 13 - Soils for Earthwork.

C. Section 31 23 16 - Excavation.

D. Section 31 23 16.13 - Trenching: Trenching and backfilling for utilities.

E. Section 31 23 23 - Fill: Filling and compaction.

F. Section 32 92 19 - Seeding: Finish ground cover.

G. Section 32 93 00 - Plants: Topsoil in beds and pits.

1.3 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

B. Materials Source: Submit name of imported materials source.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with Department of Transportation Standards in the State of New York.

B. Maintain one copy of all construction documents on site.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: See Section 31 05 13 - Soils for Earthwork.

B. Other Fill Materials: See Section 31 23 23.

PART 3 EXECUTION

3.1 EXAMINATION

A. See Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that survey bench mark and intended elevations for the Work are as indicated.

C. Verify the absence of standing or ponding water.

3.2 PREPARATION

A. Call Local Utility One Call Center @ 811in the State of New York, not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Stake and flag locations of known utilities.

D. Locate, identify, and protect from damage above- and below-grade utilities to remain.

E. Notify utility company to remove and relocate utilities.

F. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

G. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

H. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

I. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.3 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil .

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.

G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

H. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.4 SOIL REMOVAL AND STOCKPILING

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.5 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 4 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.

E. Place topsoil in areas where seeding are indicated.

F. Place topsoil where required to level finish grade.

G. Place topsoil to the following compacted thicknesses:
   1. Areas to be Seeded with Grass: 6 inches.
   2. Shrub Beds: 18 inches.

H. Place topsoil during dry weather.

I. Remove roots, weeds, rocks, and foreign material while spreading.

J. Near plants spread topsoil manually to prevent damage.

K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

L. Lightly compact placed topsoil.

M. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.6 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.7 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.8 FIELD QUALITY CONTROL

A. See Section 31 23 23 for compaction density testing.

B. Perform laboratory material tests in accordance with Department of Transportation Standards in the State of New York.

C. Perform in place compaction tests in accordance with Department of Transportation Standards in the State of New York.
   1. Density Tests.
   2. Moisture Tests.

D. When tests indicate work does not meet specified requirements, remove work, replace and retest.

3.9 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating for footings, pile caps, slabs-on-grade, paving, site structures, and landscaping.

B. Trenching for utilities outside the building to utility main connections.

C. Temporary excavation support and protection systems.

D. Soil densification

1.2 RELATED REQUIREMENTS

A. Section 31 05 13 - Soils for Earthwork: Stockpiling excavated materials.

B. Section 31 22 00 - Grading: Soil removal from surface of site.

C. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

D. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicated soil densification grid for each size and configuration footing requiring soils densification.

C. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

PART 2 EXECUTION

2.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

2.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Protect utilities that remain and protect from damage.

C. Call Local Utility One Call Center @ 811in the State of New York, not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

D. Notify utility company to remove and relocate utilities.

E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

F. Protect plants, lawns, and other features to remain.

G. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

2.3 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

A. Excavation Safety: Comply with OSHA92s Excavation Standard, 29 CFR 1926, Subpart P.
   1. Excavations in stable rock or in less than 5 feet in depth in ground judged as having no cave-in potential do not require excavation support and protection systems.
   2. Depending upon excavation depth, time that excavation is open, soil classification, configuration and slope of excavation sidewalls, design and provide an excavation support and protection system that meets the requirements of 29 CFR 1926, Subpart P:
      a. Sloping and benching systems.
      b. Support systems, shield systems, and other protective systems.

B. Leave excavation support and protection systems, used as formwork or within 10 feet of existing foundations, permanently in place, unless otherwise noted.
   1. Cut off top 4 feet below grade, abandon remainder.

C. Excavation support and protection systems not required to remain in place may be removed subject to approval of Owner or Owner's Representative.
   1. Remove temporary shoring and bracing in a manner to avoid harmful disturbance to underlying soils and damage to buildings, structures, pavements, facilities and utilities.

2.4 GENERAL EXCAVATION

A. Excavate to accommodate building foundations, slab on grade, and paving, construction operations and site structures.
   1. Excavate to the specified elevations.
   2. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
   3. Cut utility trenches wide enough to allow inspection of installed utilities.
   4. Hand trim excavations. Remove loose matter.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.

F. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

G. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 23 and Section 31 23 16.13.

H. Repair or replace any items indicated to remain damaged by excavation.

2.5 FILLING AND BACKFILLING

A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.

2.6 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or regraded, marked areas, entire site, without mixing with foreign materials for use in finish grading.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material 36 mil Hypalon material and cover over with same material, until disposal.

D. Do not remove topsoil from site.

2.7 SUBSOIL EXCAVATION

A. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

B. When excavating through roots, perform Work by hand and cut roots with sharp axe.

C. Remove excess subsoil not intended for reuse, from site.

D. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.

E. Stability: Replace damaged or displaced subsoil as specified for fill.

2.8 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

2.9 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

F. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earth operations.

END OF SECTION

SECTION 31 23 16.13
TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavation trenches for utilities outside the buildings to utility main connections.

B. Compacted fill from top of utility bedding to subgrade elevations.

C. Backfilling and compaction.

1.2 RELATED REQUIREMENTS

A. Section 31 05 13 - Soils for Earthwork: Soils for fill.

B. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill

C. Section 31 22 00 - Grading: Site grading.

D. Section 31 23 16 - Excavation: Building and foundation excavating.

E. Section 31 23 23 - Fill: Backfilling at building and foundations.

1.3 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

C. Utility: Any buried pipe, duct, conduit, or cable.

1.4 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Samples: 10 pound sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports.

F. Product Data: Submit data for geo-textile fabric indicating fabric and construction.

G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

1.7 QUALITY ASSURANCE

A. Perform work in accordance with Department of Transportation Standards in the State of New York.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 COORDINATION

A. See Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. See Section 31 23 23 - Fill.

B. See Section 31 05 13 - Soils for Earthwork.

C. See Section 31 05 16 - Aggregates for Earthwork.

2.2 ACCESSORIES

A. Geotextile: Non-biodegradable, woven.

2.3 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 31 22 00 for additional requirements.

C. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.3 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume. []

H. Remove excavated material that is unsuitable for re-use from site.

I. Stockpile excavated material to be re-used in area designated in Section 31 22 00.

J. Remove excess excavated material from site.

K. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

L. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

M. Do not advance open trench more than 100 feet ahead of installed pipe.

N. Excavate bottom of trenches maximum of 2 feet wider than outside diameter of pipe or as indicated on plans.

O. Excavate trenches to depth indicated on drawings. Provide uniform and continuous bearing and support for bedding material and pipe utilities.

P. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section or as required by OSHA.

Q. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered. Notify Architect/Engineer, and request instructions prior to excavation.

R. Cut out soft areas of sub-grade not capable of compaction in place. Backfill with approved fill material and compact to density equal to or greater than requirements for subsequent backfill material.

S. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

3.4 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.5 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

F. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

G. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.
   2. At other locations: 95 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

I. Place geotextile fabric over bedding fill prior to placing subsequent fill materials.

J. Place fill material in continuous layers and compact in accordance with schedule at end of this section.

K. Employ placement method that does not disturb or damage foundation perimeter drainage, utilities in trench, and other below grade improvements.

L. Do not leave open trenching at end of working day.

M. Protect open trenches at all times during installation of trenching.

3.6 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

3.7 TOLERANCES

A. See Section 01 40 00 - Quality Requirements: Tolerances.

B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

C. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.8 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: 1 for every 50 feet of trench.

3.9 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31 23 23
FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Filling, backfilling, and compacting for footings, slabs-on-grade, paving, and site structures.

B. Proof Rolling of filled and excavated roadways.

C. Backfilling and compacting for utilities outside the building to utility main connections.

D. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 31 05 13 - Soils for Earthwork: Soils for fill

C. Section 31 05 16 - Aggregated for Earthwork: Aggregate for fill

D. Section 31 22 00 - Grading: Site grading.

E. Section 31 23 16 - Excavation: Removal and handling of soil to be re-used.

F. Section 31 23 16.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.3 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: 6 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.4 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Soil Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

E. Compaction Density Test Reports.

F. Product Data: Submit data for geotextile fabric indicating fabric and construction.

G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
2. Prevent contamination.
3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. General Fill - Fill Type on site soil : If it conforming to State of New York DOT type 4 standard.

B. Concrete for Fill: As specified in Section 03 30 00.

C. Topsoil: See Section 31 05 13.

D. Satisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GW, GP, GM, SM, SW, and SP.

E. Unsatisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

F. Subsoil Fill: as specified in Section 31 05 13.

G. Structural Fill: as specified in Section 31 05 13 and 31 05 16.

H. Granular Fill: as specified in Section 31 05 16.

I. Drainage Fill: Material shall consist of crushed stone, sand, gravel or screened gravel. The soundness of the material shall be tested and shall have a loss not exceeding 20 percent by weight after four (4) cycles of Magnesium Sulphate Soundness Test (NYS DOT 605-202, Under drain Filter Type 1 as follows:

U.S. Sieve No.	Percent Passing by Weight
1 inch	100
1/2 inch	30-100

1/4 inch	0-30
No. 10	0-10
No. 20	0-5

J. Backfill Material: Naturally or artificially graded mixture of sand, natural or crushed stone or gravel conforming to NYS DOT Item 304-2.02, Type 4 as follows:

U.S. Sieve No.	Percent Passing by Weight
2 inch	100
1/4 inch	30-65
No. 40	5-40
No. 200	0-10

2.2 ACCESSORIES

A. Geotextile Fabric: Non-biodegradable, woven, fabric ; 500X manufactured by Mirafi , or approved equal.

B. Filter Fabric: Non-biodegradable, non-woven, fabric; Mirafi 140N, or approved equal.

C. Geotextile Fabric for Perforated Drain Pipe: Non-biodegradable, non-woven, fabric; Mirafi 140N, or approved equal.

2.3 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 31 22 00 for additional requirements.

D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

E. Verify structural ability of unsupported walls to support imposed loads by the fill.

F. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

G. Verify areas to be filled are not compromised with surface or ground water.

3.2 PREPARATION

A. Scarify subgrade surface to a depth of 8 inches.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill and compact to density equal to or greater than requirements for subsequent fill material.

C. Compact subgrade to density requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

E. The subgrade and subbase shall be proof rolled. Contact engineer or owners representative 24 hours before testing. If subgrade stabilization or undercutting is designed for the project, then proof rolling shall be used to verify the undercut replacement material stability.

F. Proof rolling deflections and soil conditions that are observed during construction determine if the plan subgrade treatment must be adjusted. Adjustment of subgrade treatment to fit field conditions is essential and is the responsibility of the contractor.

G. Provide subgrade corrections prior to proof rolling

H. When rutting and deflection occur under wheels of 10-wheel dump truck engineer or representative will require corrective action.

I. Improve subbase or subgrade by undercutting wet material, aeration of wet soil or use of additional subbase material. Compact material and proof roll again.

J. If needed, make the correction by excavating and disposing of soft grade, and replacing it with NYSDOT type 4 subbase material.

K. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

L. The proof rolling should be done immediately after the subgrade compaction operation, when the moisture content of the subgrade soil is near optimum or at the moisture content that achieved compaction. This minimizes the chances of the subgrade becoming too wet or too dry for an effective proof rolling evaluation. If the subgrade is too wet, the material will displace and rut. If the subgrade is too dry, a dry hard surface crust may carry the proof roller over an undesirable soft wet underlying material without rutting or deflection, and the soft subgrade may not be detected.

M. Proof rolling may be done either before or after pipe underdrains are installed. If done after underdrains are installed, rolling should not be done directly over the underdrains. Proof rolling must be performed at least 1-½ feet (0.5 meters) away from the underdrains because of the potential damage to the underdrains.

3.3 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

G. Subsoil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Structural Fill: Place and compact material in equal continuous layers not exceeding 6 inches compacted depth.

I. Slope grade away from building minimum 2 percent slope for minimum distance of 5 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

J. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

K. Backfill simultaneously on each side of unsupported foundation walls until supports are in place

L. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 95 percent of maximum dry density.
   2. Other areas: Use structural fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

M. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
   2. At other locations: 95 percent of maximum dry density.

N. Reshape and re-compact fills subjected to vehicular traffic.

O. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

P. Remove surplus backfill materials from site.

Q. Leave fill material stockpile areas free of excess fill materials.

3.4 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

3.5 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of Filling Within Building Areas: Plus or minus 1/2 inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938. Contractor shall be responsible for providing compaction testing as part of their base bid contract. Slab testing shall be every 100 square feet of area or every 50-ft of trench excavation.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: 1 test for every truck load of material delievered.

F. Proof roll compacted fill at surfaces that will be under slabs-on-grade, pavers, and paving.

3.7 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

3.8 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 32 01 90
OPERATION AND MAINTENANCE OF PLANTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Maintain plants in manner that promotes health, growth, color and appearance, to quality levels specified; replace dead, dying, and damaged plants at no extra cost to Owner.
   1. It is Contractor's responsibility to determine type and quantity of soil amendments and fertilizer required.
   2. Perform soil analysis to determine type and quantity of soil amendments; test enough soil samples to obtain a comprehensive analysis; submit reports.

B. Maintain newly planted landscape plants, including turf (lawns), trees, shrubs, and perennials.

C. Refresh mulch and landscape fabric around the following established landscape plants within the project boundaries in areas indicated on the drawings: shrubs, ground cover, and perennials.

D. Clean up landscaped areas.

E. Maintenance Period
   1. The date of installation to the date upon which the new planting are accepted as complete by Architect.

1.2 RELATED REQUIREMENTS

A. Section 32 92 19 - Seeding.

B. Section 32 93 00 - Plants.

1.3 REFERENCE STANDARDS

A. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2017.

B. ANSI Z133.1 - American National Standard For Arboricultural Operations - Pruning, Repairing, Maintaining, And Removing Trees, And Cutting Brush - Safety Requirements; 2012.

C. ASTM C602 - Standard Specification for Agricultural Liming Materials; 2013a.

D. ASTM D4972 - Standard Test Method for pH of Soils; 2018.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Soil Tests and Analysis: Submit report showing number of samples, test results, and recommendations for soil amendments and fertilizer.

PART 2 PRODUCTS

2.1 FERTILIZERS AND SOIL AMENDMENTS

A. Soil Amendments: Type and quantity as required to achieve specified results, based on soil analysis.

2.2 APPLIED MATERIALS

A. Organic Mulch: Maintain general appearance of existing mulched areas; use one of the following types:
   1. Wood chips ranging in size from 1/2 inch to one inch.
   2. Ground or shredded bark.

B. Water: Suitable for irrigation; Owner's water supply may be used.

PART 3 EXECUTION

3.1 EXAMINATION

A. If soil analysis has not already been performed, take sufficient samples to obtain a comprehensive analysis; perform analysis in accordance with ASTM D4972.

3.2 LANDSCAPE MAINTENANCE - GENERAL

A. Protect existing vegetation, pavements, and facilities from damage due to maintenance activities; restore damaged items to original condition or replace, at no extra cost to Owner.

B. General Cleanup: Remove debris from all landscape areas at least once a week and from turf areas before each mowing.
   1. Debris consists of trash, rubbish, dropped leaves, downed branches and limbs of all sizes, dead vegetation, rocks, and other material not belonging in landscaped areas.
   2. Remove debris from site and dispose of properly.

C. Watering, Soil Erosion, and Sedimentation Control: Comply with federal, state, local, and other regulations in force; prevent over-watering, run-off, erosion, puddling, and ponding.
   1. Repair temporary erosion control mechanisms provided by others.
   2. Repair eroded areas and replant, when caused by inadequate maintenance.
   3. Prevent sediment from entering storm drains.

D. Trees: Exercise care to avoid girdling trees; provide protective collars if necessary; remove protective collars at end of maintenance period.

E. Fertilizing: Apply fertilizer only when necessary.

F. Health Maintenance: Inspect all plants regularly for health:
   1. Eradicate diseases and damaging pests, regardless of severity or speed of effect.
   2. Treat accidental injuries and abrasions.
   3. If a plant is unhealthy but not yet dead, according to specified definitions, determine reason(s) and take remedial action immediately.
   4. Remove dead plants immediately upon determining that they are dead.

G. Replanting: Perform replacement and replanting immediately upon removal of dead plant.

3.3 IRRIGATION

A. Irrigation: Do not allow plants to wilt; apply water as required to supplement rainfall; do not waste water; do not water plants or areas not needing water; do not water during rainfall; shut off water flow when finished; repair leaks.
   1. No automatic irrigation system is available; provide hoses and other equipment as required.
   2. Owner's water source may be used.
   3. Do not drive water trucks over turf, seeded areas, or planting beds.
   4. Provide backflow preventers on hose bibbs used for irrigation hoses.

3.4 TURF MAINTENANCE

A. Maintain turf in manner required to produce turf that is healthy, uniform in color and leaf texture, and free from weeds and other undesirable growth.
   1. Grass Density - Lawns: 20 plants per square foot, minimum.
   2. Bare Spots - Lawns: 2 percent of total area, maximum; 6 inches square, maximum.
   3. Keep turf relatively free of thatch, woody plant roots, diseases, nematodes, soil-borne insects, stones larger than 1 inch in diameter, and other materials detrimental to grass growth.
   4. Limit broadleaf weeds and patches of foreign grass to a maximum of 2 percent of the total area.

B. Mowing: During growing season(s) mow turf to uniform height, in manner that prevents scalping, rutting, bruising, and uneven or rough cutting.
   1. Prior to mowing clean all debris and leaves from turf surface.
   2. Schedule frequency of mowing so that no more than one-quarter to one-third of grass leaf length is removed during a cutting.
   3. Make each successive mowing at approximately 45 degrees to the previous mowing, if practical.
   4. Cool Season Grasses:
      a. Reduce mowing height in fall and spring.
      b. Use rotary type mowers; mulcher type mowers may be used.
   5. Warm Season Grasses:
      a. Increase mowing height slightly as fall approaches.
      b. Use reel type mowers; do not use mulcher mowers.

C. Trimming: Immediately after each mowing, neatly trim perimeter of each turf area and around obstructions within turf area; match height and appearance of adjacent turf.
   1. Adjacent to Pavements: Cut edges of turf to form a distinct, uniform turf edge.
   2. Adjacent to Planting Beds and Permanently Mulched Areas: Cut edges of turf to form a distinct, uniform turf edge.
   3. Around Other Trees and Poles: Where no planting bed or mulched area exists, trimming with string trimmer is acceptable.
   4. At Fences: Trim on both sides of fence.
   5. Irrigation Heads and Valve Boxes: Trim neatly so grass doesn't interfere with operation.

3.5 PLANTING BED MAINTENANCE

A. Planting beds include all planted areas except turf.

B. Begin maintenance immediately after plants have been installed; inspect at least once a week and perform needed maintenance promptly.

C. Keep planting beds free of pests; remove weeds and grass by hand before reaching 1 inch height.

D. Do not allow climbing, twining, or creeping plants to encroach into other species.

E. Replace mulch as required and remove debris.

3.6 TREE AND SHRUB MAINTENANCE

A. Trees will be considered dead when main leader has died back or when 25 percent or more of crown has died; except as otherwise indicated for palm trees.

B. Shrubs will be considered dead when 25 percent or more of plant has died.

C. Inspect woody plants for health by scraping up to 1/16 inch square area of bark; no green cambium layer below bark shall be evidence of death.

D. Adjust stakes, guys and turnbuckles, ties, and trunk wrap as required to promote growth and avoid girdling.

E. Pruning: Unless otherwise indicated, prune only to maintain balanced natural shape; follow recommendations of ANSI A300 and ANSI Z133.1 and best local practices for species involved.

F. Shrubs: Prune at least once during maintenance period at best time to influence ultimate shape and size for the particular species.
   1. Prune to balance the plant's form and according to its natural growth characteristics.
   2. Remove water shoots, suckers, and branches not complying with desired shape and size.

G. Hedges: Trim to encourage growth into voids and gaps.

H. Renovation of Established Shrubs: Prune and trim as required to improve shape and balance as appropriate to the particular species; remove dead, damaged, and diseased branches and limbs; do not remove excess growth except as follows:
   1. Remove growth in front of windows, above or obstructing entranceways and walkways, leaning against structures, and obstructing vision at street intersections.

3.7 CLEANING

A. Remove fallen deciduous leaves in Fall; removal may wait until all leaves have fallen.

B. Clean adjacent pavements of plant debris and other debris generated by maintenance activities.

C. Remove and dispose of general cleanup debris and biodegradable debris in a proper manner; Owner's trash collection facilities may be used.

D. Remove and dispose of general cleanup debris and biodegradable debris in a proper manner.
   1. Biodegradable Debris: Owner will designate a compost pile on site where biodegradable debris may be deposited; branches and bark are not considered biodegradable.
   2. Branches and Bark: Owner will designate a wood chip storage area; machine-chip all branch and bark debris.
   3. Non-Biodegradable Debris: Owner's trash collection facilities may be used.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

1.2 RELATED REQUIREMENTS

A. Section 31 05 16 - Aggregates for Earthwork.

B. Section 31 23 23 - Fill: Compacted fill under base course.

1.3 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017.

G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

D. Compaction Density Test Reports.

1.5 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate where directed by Owner.

C. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 MATERIALS

A. As specified in section Aggregates for Earthwork Section 31 05 16.

B. Geotextile: Nonbiodegradable, woven.

2.2 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.3 INSTALLATION

A. Spread aggregate over prepared substrate to a total compacted thickness as detailed.

B. Place aggregate in maximum 6 inch layers and roller compact to specified density.

C. Level and contour surfaces to elevations and gradients indicated.

D. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From Design Elevation: Within 1/2 inch.

3.5 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection and testing.

B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: 1 per 2500 sq. ft. or as required by the Engineer.

F. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.6 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

B. Single course bituminous concrete paving.

C. Double course bituminous concrete paving.

1.2 RELATED REQUIREMENTS

A. Section 31 05 16 - Aggregates for Earthwork

B. Section 31 22 00 - Grading: Preparation of site for paving and base.

C. Section 31 23 23 - Fill: Compacted subgrade for paving.

D. Section 32 17 23 - Pavement Markings.

1.3 REFERENCE STANDARDS

A. AI MS-2 - Asphalt Mix Design Methods; 2015.

B. AI MS-19 - Basic Asphalt Emulsion Manual; 2008.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.4 ADMINISTRATIVE REQUIREMENTS

A. See Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene pre-installation meeting a minimum of one week prior to commencing work of this section. Attendance by Architect/ Engineer, Construction Manager, Owner, and Contractor.

C. Schedule a proof roll of subbase prior to asphalt installation.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Submit proposed mix design of each class of mix for review prior to beginning of Work.
   1. Each mix design shall be certified and signed by the respective State Department of Transportation within two years preceding submittal.

C. Product Data: Provide product data on each additional product required, including, but not limited to primer, tack coat, and joint sealant.

D. Asphalt Pavement Workplan: Indicate paving pass width, paving directions, site access, and coordination of timing with other installations.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with Department of Transportation Standards in the State of New York.

B. Mixing Plant: Conform to Department of Transportation Standards in the State of New York.

C. Obtain materials from same source throughout.

1.7 FIELD CONDITIONS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen, and as further provided:

TEMPERATURE REQUIREMENTS	
Nominal Compacted Lift Thickness	**Surface Temperature Minimum**
No greater than 1 inch	50 degrees F.
1 inch through 3 inches	45 degrees F.
Greater than 3 inches	40 degrees F.

C. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

1.8 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum 10 years documented experience.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Comply with applicable code for paving work on public property.

2.2 MATERIALS

A. Asphalt Cement: Conforming to Department of Transportation Standards in the State of New York.

B. Aggregate for Base Course: Conforming to Department of Transportation Standards in the State of New York.

C. Aggregate for Binder Course: Conforming to Department of Transportation Standards in the State of New York.

D. Aggregate for Wearing Course: Conforming to Department of Transportation Standards in the State of New York.

E. Fine Aggregate: Sand in conformance with Department of Transportation Standards in the State of New York.

F. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.

G. Primer: Homogeneous, medium curing, liquid asphalt in accordance with Department of Transportation Standards in the State of New York.

H. Tack Coat: Homogeneous and Emulsified asphalt conforming to Department of Transportation Standards in the State of New York.

I. Joint Sealant: Asphalt joint sealant meeting ASTM D6690 Type II or IV requirements.

J. Seal Coat: AI MS-19, Seal Master LV concentrate pavement sealer. Manufactured by SealMaster, 800-395-7325, www.sealmaster.net or approved equal.

2.3 ASPHALT PAVING MIXES AND MIX DESIGN

A. Use dry material to avoid foaming. Mix uniformly.

B. Binder Course: State of New York Highways standards: Superpave 25mm Binder.

C. Wearing Course: State of New York Highways standards: Superpave 9.5mm Top Course.

D. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.4 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

B. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

2.5 EQUIPMENT

A. Hauling Equipment
1. Trucks used for hauling asphalt shall have clean, smooth, tight metal beds.
a. Any debris from previous loads hauled shall be removed.
2. The inside of the truck box shall be coated with a Department of Transportation approved release agent.
a. Petroleum products, (including but not limited to fuel oil, diesel fuel, kerosene, and gasoline) or solvents shall not be used.
3. Trucks shall be equipped with waterproof covers that totally cover the asphalt load, the front of which is attached to prevent wind from entering under tarp during transport.

B. Pavers
1. Units shall be self-propelled and include receiving hopper, transfer system, and activated screed.
2. Units shall provide automatic slope control.
3. Units shall be equipped with screed heaters and joint pre-heaters.

C. Rollers
1. Rollers shall be of vibratory or static steel wheel design, of sufficient weight to adequately provide compaction rate specified.
2. Furnish the following minimum roller quantities per project:
a. Total Rollers: Two.
b. Total Rollers: Three, when tonnage is 300 tons per day or greater.
c. In every instance, one of the required rollers shall be of a Vibratory Wheel design.
3. Equipment shall be free from oil leaks.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

C. Verify gradients and elevations of base are correct.

D. Verify gutter drainage grilles and frames manhole frames and curbing are installed in correct position and elevation.

3.2 PREPARATION - PRIMER

A. Apply primer in accordance with manufacturer's instructions and in conformance with Department of Transportation Standards in the State of New York.
   1. Primer shall be placed on aggregate base in all Department of Transportation right-of-ways.

B. Apply primer on aggregate base or subbase at uniform rate of 1/2 gal/sq yd.

3.3 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat in accordance with Department of Transportation Standards in the State of New York.
   1. Apply tack coat between all pavement layers within Department of Transportation right-of-ways.
   2. Apply tack coat between pavement layers when:
      a. Pavement is exposed to traffic.
      b. Pavement is exposed to dirt and dust.
      c. Forty eight hours have passed between courses.
   3. Apply tack coat to milled surfaces prior to overlay.

C. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of .03 to .10 gallons per square yard.

D. Apply tack coat to all contact surfaces of curbs, gutters, manholes, and adjacent pavement edges.

E. Paving shall not commence until tack coat emulsion has broken or is tacky to the touch.

3.4 PREPARATION – SURFACE SEALER

A. Surface must be clean and free of all loose material and dirt.

B. Pavement surface repairs shall be made with suitable hot or cold asphalt mix.

C. Cracks shall be filled with hot or cold pour filler.

D. Treat all grease, oil, gasoline spots or stains with SealMaster Petro Seal or Prep Seal, or approved equal.

3.5 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install in accordance with Department of Transportation Standards in the State of New York.

B. Place asphalt within 24 hours of applying primer or tack coat.

C. Install gutter drainage grilles and frames in correct position and elevation.

D. Place asphalt wearing course to thickness as identified on construction drawings.

E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
   1. Compaction should occur when asphalt course is between 150 and 185 degrees F.

F. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.6 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place asphalt wearing course within two hours of placing and compacting binder course.

C. Install gutter drainage grilles and frames in correct position and elevation.

D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
   1. Compaction should occur when asphalt course is between 150 and 185 degrees F.

E. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.7 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

C. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

D. Variation from True Elevation: Within 1/2 inch.

3.8 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with Department of Transportation Standards in the State of New York.

3.9 CLOSEOUT ACTIVITIES

A. See Section 01 70 00 - Execution and Closeout Requirements

B. Documentation: Provide copies of Truck Loading Slips (bill of lading) for each load of each design mix of asphalt material used on site.

3.10 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 3 days or until surface temperature is less than 140 degrees F.

B. Surface Sealer drying time: 8 hours max.

END OF SECTION

SECTION 32 12 17
ASPHALT PAVING JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Asphalt and concrete paving crack sealants

B. Hot pour mastics

1.2 RELATED REQUIREMENTS

A. Section 32 12 16 - Asphalt Paving

B. Section 32 13 13 - Concrete Paving

1.3 PRICE AND PAYMENT PROCEDURES

A. Unit Prices: See Section 01 22 00 - Unit Prices, for additional unit price requirements.

1.4 REFERENCE STANDARDS

A. ASTM D113 - Standard Test Method for Ductility of Asphalt Materials; 2017

B. ASTM D3111 - Standard Test Method for Flexibility Determination of Hot-Melt Adhesives by Mandrel Bend Test Method

C. ASTM D36 - Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

D. ASTM D5078 - Standard Specification for Crack Filler, Hot Applied, for Asphalt Concrete and Portland Cement Concrete Paving.(Reapproved 2016)

E. ASTM D5329 - Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements; 2016

F. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements; 2015

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate work of this section with Owner, Architect, and all other trades involved in the project.
   1. Ensure work of this section is scheduled and carried out so as not to limit access to site.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.6 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's product data sheets, performance criteria and installation instructions.

C. Manufacturer's Instructions: Indicate preparation requirements, application limitations, and environmental conditions required for installation.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

A. Perform work in accordance with Department of Transportation Standards in the State of New York in DOT Right-of-Ways.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

D. Obtain materials from same source throughout project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products specified herein to project site in manufacturer's unopened, undamaged packaging..

B. Store products under cover and elevated above grade, and as recommended by manufacturer.
   1. Prevent damage due to moisture, temperature extremes, or contaminants.

1.9 FIELD CONDITIONS

A. See Section 01 60 00 - Product Requirements,

B. Ensure all application limitations including manufacturer's, temperature, and weather are within specified limits.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty for each product.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Maxwell Products, Inc.: www.maxwellproducts.com.

B. P&T Products, Inc.: www.p-tproductsinc.com.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. Joint Sealants for parking lots and non-DOT right-of-ways.
   1. Polymer modified crack and joint sealant
   2. Conforming to ASTM D5078
   3. Basis of Design Product: Elastoflex 650 by Maxwell Products.
      a. Or approved equal
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Joint Sealants for DOT right-of-ways.
   1. Polymer modified crack and joint sealant
   2. Conforming to ASTM D6690 Type I
   3. Basis of Design Product: Elastoflex 410 by Maxwell Products.
      a. Or approved equal
   4. Substitutions: See Section 01 60 00 - Product Requirements.

C. Hot Pour Mastic for wide cracks or surface repair:
   1. Basis of Design Product: GAP B by Maxwell Products.
      a. Or approved equal
   2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that all areas to receive work of this section are available, and conditions are favorable for work to proceed.

3.2 PREPARATION

A. Prepare cracks for sealing on the same day they are to be sealed. Install suitable traps or devices on the compressed air equipment to prevent moisture and oil from contaminating the joint surfaces. Maintain these devices and see that they are functioning properly.

B. Hot Air Lance: In order to thoroughly clean and dry cracks of dust, dirt, foreign material, sand and any other extraneous materials immediately prior to sealing joints. Using compressed air no lower than 90 cfm to 185 cfm, the operator shall blow dry the affected cracks to receive the hot pour sealant. To clean and ensure a dry condition, a hot air lance capable of reaching temperatures ranging from a low end 600 degrees F to 2,000 degrees F shall be used. Do not burn, or scorch the adjoining pavement when using a hot air lance.
   1. The hot air lance preparation shall not exceed 200 yards in front of the sealing operation. The compressor delivering the pressurized air shall have functional water and oil separators to ensure no moisture is injected into the cracks.

3.3 SEALANT MELTING

A. Heat and melt the sealant in a melter constructed either as a double boiler filled with a heat-transfer medium between the inner and outer shells, or with internal tubes or coils carrying the sealant through a heated oil bath and into a heated double wall hopper. The melter will be equipped with separate thermometers to indicate the temperature of the heat transfer medium and the sealant material, positive temperature controls and with a mechanical agitator and recirculating pumping of sealant to assure a homogeneous blend of the sealant. Maintain the sealant temperature inside the tank at the manufacturer’s recommended pouring temperature as indicated on the material packaging of the sealant.

B. To ensure proper sealant application temperature check the discharge of the sealant with a non-contact infrared thermometer. Discharge the sealant at a temperature between the manufacturer's recommended pouring and safe heating temperatures indicated on the material packaging.

C. Sealing is not permitted if the melter and discharge temperatures do not meet with the requirements described above. Circulate the sealant from the discharge hose and the melter to maintain the proper sealant pouring temperature.

D. Do not use sealant material heated beyond the safe heating temperature. If the manufacturer's recommendations allow the sealant to be reheated or heated in excess of six hours, recharge the melter with fresh material amounting to at least 20 percent of the volume of the material remaining in the melter.

3.4 PLACING JOINT SEALANT

A. Sealing is to be done when ambient air temperature is at or above 40F. Seal the routed crack by placing the applicator wand in or directly over the recess and carefully discharge the sealant. Strike-off the sealant flush with the pavement surface so that only a narrow thin film of material measuring no wider than 2 inches wide and 1/16 inch thick is allowed on the pavement surface after sealing the reservoir. Properly sealed joints shall be watertight.

B. A low pressure, light spray of water or a manufacturer recommended barrier spray may be used to accelerate cooling of the sealant and allow traffic on it without tracking. Blotting the sealant with fine aggregate is not allowed.

C. Remove and dispose sealant in excess of the specified thin "film" dimensions or that has not bonded to both sides of the reservoir.

3.5 WIDE CRACKS AND PATCHING

A. Cracks wider than one inch, small potholes and other pavement imperfections as outlined by the Engineer are to be repaired and filled with the hot pour mastic.

B. Preparing the repair areas is the same process used for crack sealing as outlined above. Equipment used for the heating of the mastic shall conform with the same standards outlined for crack sealing with the exception of having any activity requiring the recirculation or pumping of the material. Due to the high abrasive content of the aggregate no pumping can be used. A gravity discharge directly into the repair area or a box screen applicator shall be used to fill and repair the pavement. To install a proper filled and waterproof repair heated flat stock steel shall be used to ensure the material overbids the repair by 2 inches on all sides. The hot steel plate shall be used to smooth the surface of the mastic.

C. When manufacturers require a primer prior to installation or a finishing stone topping, it shall be applied in accordance with the materials installation instructions supplied by the manufacturer.

D. No traffic shall be allowed on top of the mastic repair unit the temperature cools to ensure no damage to the repair or oncoming traffic.

3.6 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.7 PROTECTION

A. Protect installed joint sealants and patches from subsequent construction operations.

B. Protect sealed areas from vehicular and pedestrian traffic until products have set sufficiently to prevent tracking of sealants.

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, and roads.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 07 92 00 - Joint Sealants: Sealing joints.

C. Section 31 22 00 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.

D. Section 31 23 23 - Fill: Compacted subbase for paving.

E. Section 32 12 16 - Asphalt Paving: Asphalt wearing course.

1.3 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Structural Concrete; 2016.

C. ACI 305R - Guide to Hot Weather Concreting; 2010.

D. ACI 306R - Guide to Cold Weather Concreting; 2016.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.

F. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.

G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2019a.

H. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

I. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2017.

J. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.

K. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2018.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on joint filler, admixtures, and curing compound.

C. Samples: Submit two sample panels, 12 by 12 inch in size illustrating exposed aggregate finish.

PART 2 PRODUCTS

2.1 PAVING ASSEMBLIES

A. Comply with applicable requirements of Department of Transportation Standards in the State of New York.

2.2 FORM MATERIALS

A. Form Materials: As specified in Section 03 30 00, conform to ACI 301.

B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).

2.3 REINFORCEMENT

A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 30 00.

B. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish.

2.4 CONCRETE MATERIALS

A. Obtain cementitious materials from same source throughout.

B. Concrete Materials: As specified in Section 03 30 00.

C. Fiber Reinforcement: Synthetic fibers shown to have long-term resistance to deterioration when in contact with alkalis and moisture; 1/2 inch length.

2.5 ACCESSORIES

A. Curing Compound: Conforming with Department of Transportation Standards in the State of New York.

B. Liquid Surface Sealer: Conforming with Department of Transportation Standards in the State of New York.

C. Tactile Warning Surfaces: See Section 32 17 26.

2.6 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.

E. Concrete Properties:
   1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 4,000 psi.
   2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
   3. Cement Content: Minimum 605 lb per cubic yard.
   4. Water-Cement Ratio: Maximum 40 percent by weight.
   5. Total Air Content: 5.0 to 8.0 percent, determined in accordance with ASTM C173/C173M.
   6. Maximum Slump: 4 inches.
   7. Maximum Aggregate Size: 1 inch.

2.7 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 SUBBASE

A. See Section 32 11 23 for construction of base course for work of this Section.

3.3 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.

C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.4 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.5 REINFORCEMENT

A. Place reinforcement at as indicated on the construction drawings.

B. Interrupt reinforcement at expansion joints.

3.6 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or if surface is wet or frozen.

3.7 PLACING CONCRETE

A. Coordinate installation of snow melting components.

B. Place concrete as specified in Section 03 30 00.

C. Do not place concrete when base surface is wet.

D. Place concrete using the slip form technique.

E. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

F. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

G. Place concrete to pattern indicated.

3.8 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 1/2 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
   1. Form joints with joint filler extending from bottom of pavement to within 1/4 inch of finished surface.
   2. Secure to resist movement by wet concrete.

C. Provide scored joints.
   1. As indicated on plan.
   2. At 5 feet intervals.
   3. Between sidewalks and curbs.
   4. Between curbs and pavement.
   5. Scores to be a 2" tooled joint.

D. Provide keyed joints as indicated.

E. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

F. Joint Sealants:
   1. Apply joint sealants to expansion joints, and other areas indicated.
   2. See Section 07 92 00 - Joint Sealants for sealant type and application.
   3. In addition to the requirements of 07 92 00, apply sealants prior to first freezing temperatures, and when substrate can be maintained at 40 degrees F, minimum for 48 hours prior to and 72 hours following application.

3.9 FINISHING

A. Area Paving: Light broom, texture perpendicular to pavement direction.

B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

C. Median Barrier: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

D. Curbs and Gutters: Light broom, texture parallel to pavement direction.

E. Inclined Vehicular Ramps: Broomed perpendicular to slope.

F. Place sealer on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.10 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

B. Maximum Variation From True Position: 1/4 inch.

3.11 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.
   2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
   3. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
   1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
   2. Perform one slump test for each set of test cylinders taken.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.12 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 32 15 01
GRANITE CURB

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stone curbing straight and mountable.

B. Concrete base and backing.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete

B. Section 31 05 16 - Aggregates for Earthwork

PART 2 PRODUCTS

2.1 MATERIALS

A. Stone: Granite shall be tough, dense, sound and durable, of uniform light color, reasonably fine grained and free from seams, cracks or other structural defects.
   1. NYS DOT Type "C" unless otherwise indicated on drawings.

B. Granite Curbs:
   1. Furnish curbs with sawed top, split face and ends. Straight pieces shall be a minimum of 3 feet long. Curb segments on curves with radius of 100 feet or less shall be shaped to the required curvature, with the ends split on radial lines.
   2. Indicated dimensions for curb segments shall not vary more than 2 inches for depth and 1 inch for width.
   3. Top and front surfaces shall be true planes at right angles to each other, as seen with a straight edge. No projection greater than 3/4 inch or depression greater than 1/2 inch on the split surfaces will be acceptable. Top surface shall not vary more than 1/8 inch.
   4. Drill holes will not be permitted in exposed curb surfaces.

C. Dry Concrete: One part Portland cement mixed with six parts DOT No. 1A coarse aggregate dry mix.
   1. Wet Concrete Backing: Normal weight, air entrained concrete with a minimum compression strength of 2000-2500 P.S.I. at 28 days. Continuous concrete backing shall be placed behind curb.

PART 3 EXECUTION

3.1 INSTALLATION

A. Set curbs true to line and grade on a foundation of one cubic foot of dry concrete for each linear foot of curb installed. Fill voids to completely support entire length of curb.

B. Butt-joint curb sections together. Curb sections shall not be fitted closer than 1/8" at the axis line.

C. Joints shall be filled with cement mortar, the top and exposed face of the joint shall be neatly pointed flush with curb surfaces and satisfactorily cleaned of all excess mortar.

END OF SECTION

SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Painted pavement markings.

B. Temporary Marking Tape.

1.2 RELATED REQUIREMENTS

A. Section 32 12 16 - Asphalt Paving.

B. Section 32 13 13 - Concrete Paving.

C. Section 32 17 26 - Tactile Warning Surfacing.

1.3 REFERENCE STANDARDS

A. AASHTO MP 24 - Standard Specification for Waterborne White and Yellow Traffic Paints; 2015 (Reapproved 2020).

B. ASTM D4505 - Standard Specification for Preformed Retroreflective Pavement Marking Tape for Extended Service Life; 2012 (Reapproved 2017).

C. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work of this section with adjoining work.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by affected installers.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate survey control points and pavement markings color and layout.
   1. Layout and color shall be Owner approved prior to application.

C. Product Data: Manufacturer's data sheets on each product to be used.

D. Certificates: Submit for each batch stating compliance with specified requirements.
   1. Painted pavement markings.

E. Manufacturer's Instructions:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.8 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

1.9 SEQUENCING

A. Allow new pavement surfaces to cure for a period of not less than 30 days before application of markings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Painted Pavement Markings:
   1. Ennis-Flint: www.ennisflintamericas.com.
   2. Franklin Paint; HYDROPHAST: www.franklinpaint.com.
   3. Ozark Materials, LLC: www.ozarkmaterials.net .
   4. Sherwin Williams: www.sherwin-williams.com.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Temporary Marking Tape:
   1. 3M: Stamark: www.3m.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTED PAVEMENT MARKINGS

A. Painted Pavement Markings: As indicated on drawings.
   1. Marking Paint: Latex Based, in accordance with AASHTO MP 24.
      a. Roadway Markings:
         1) Center Lines: Yellow.
      b. Parking Lots: White.
      c. Symbols and Text: White.
      d. Accessible Symbols: Provide blue.

2.3 TEMPORARY MARKING TAPE

A. Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

PART 3 EXECUTION

3.1 EXAMINATION

A. Owner verification: Verify by Owner approved shop drawings of new pavement markings prior to beginning application.
   1. Final approval by Owner following chalking out, shall be required.

B. Verification of Conditions: Verify that pavement is dry and ready for installation.

C. Notify Architect of unsatisfactory conditions before proceeding.

3.2 PREPARATION

A. Establish survey control points for locating and dimensioning of markings.

B. Place barricades, warning signs, and flags as necessary to alert approaching traffic and prevent traffic crossing newly painted markings.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

D. Clean surfaces prior to installation.
   1. Remove dust, dirt, and other debris by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
   2. Remove rubber deposits and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
   3. Remove existing paint markings by mechanical means outlined above or by applying obliterating paint.
   4. Sandblasting: Use equipment of size and capacity necessary, providing not less than 150 cfm of air at pressure not less than 90 psi at each nozzle used.

E. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

F. Temporary Markings: Apply as directed by Architect.

G. Apply paint stencils by type and color at necessary intervals.

3.3 INSTALLATION

A. General:
   1. Position pavement markings as indicated on drawings and approved shop drawings.
   2. Field location adjustments require approval of Architect and Owner.
   3. Allow traffic movement without hindrance.

B. Painted Pavement Markings:
   1. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

2. Apply in accordance with FHWA MUTCD standards.
3. Marking Paint: Apply uniformly, with sharp edges.
   a. Applications: One coat.
   b. Wet Film Thickness: 0.015 inch, minimum.
   c. Stencils: Lay flat against pavement, align with striping, remove after application.
   d. Length Tolerance: Plus or minus 3 inches.
   e. Width Tolerance: Plus or minus 1/8 inch.
4. Roadway Traffic Lanes: Use suitable mobile mechanical equipment that provides constant agitation of paint and travels at controlled speeds.
   a. Conduct operations in such a manner that necessary traffic can move without hindrance.
   b. If paint does not dry within expected time, discontinue paint operations until cause of slow drying is determined and corrected.
   c. Skip Markings: Synchronize one or more paint "guns" to automatically begin and cut off paint flow; make length of intervals as indicated.
   d. Use hand application by pneumatic spray for application of paint in areas where a mobile paint applicator cannot be used.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Perform field inspection for deviations from true alignment or material irregularities.

C. If inspections indicate work does not meet specified requirements, rework and reinspect at no cost to Owner.
   1. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
   2. Remove unsatisfactory markings in a manner to avoid damage to the surface to which the marking was applied by carefully controlled sandblasting, approved grinding equipment, or other approved method.

D. Allow the pavement marking to set at least the minimum time recommended by manufacturer.

3.5 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals for additional requirements.

B. Temporary Markings: Remove without damaging surfaces.

3.6 PROTECTION

A. Prevent approaching traffic from crossing newly applied pavement markings.

B. Replace damaged or removed markings at no additional cost to Owner.

C. Preserve survey control points until pavement marking acceptance.

END OF SECTION

SECTION 32 17 26
TACTILE WARNING SURFACING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for sidewalks and platforms.

B. Section 32 13 13 - Concrete Paving: Concrete sidewalks.

1.3 REFERENCE STANDARDS

A. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA); current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

E. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; 2011.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.

C. Shop Drawings: Submit plan and detail drawings. Indicate:
   1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
   2. Sizes and layout.
   3. Pattern spacing and orientation.
   4. Attachment and fastener details, if applicable

D. Warranty: Submit manufacturer warranty; complete forms in Owner's name and register with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.

B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.

B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F.

1.7 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Cast Iron Tiles: Provide manufacturer's standard ten year warranty against manufacturing defects, breakage or deformation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cast Iron Detectable Warning Plates:
1. ADA Solutions, Inc: www.adatile.com/#sle.
2. EJ: www.ejco.com/#sle.
3. Neenah Foundry, a division of Neenah Enterprises, Inc: www.nfco.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TACTILE AND DETECTABLE WARNING DEVICES

A. Cast Iron Detectable Warning Plates:
1. Material: Cast gray iron; ASTM A48/A48M, Class 30 A (minimum).
2. Installation Method: Cast in place.
3. Shape: Rectangular and Radius.
4. Square Dimensions: 24 inches square.
5. Radius Dimensions: 24 inches wide, 9 feet, 5 inch radius, or as noted on construction drawings.
6. Pattern: Truncated cones in compliance with ADA Standards.
7. Joint: Manufacturer standard, bolted connection.
8. Finish: Manufacturer's factory-applied powder coat.
9. Color: As selected by Architect from manufacturer's standard range.
10. Products:
    a. Neenah Foundry, a division of Neenah Enterprises, Inc: www.nfco.com/#sle.
    b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 ACCESSORIES

A. Fasteners: ASTM A666, Type 304 stainless steel
1. Type: Countersunk, color matched composite sleeve anchors
2. Size: 1/4 inch diameter and 1-1/2 inches long.

B. Adhesive: Type recommended and approved by surfacing tile manufacturer.

C. Sealant: Elastomeric sealant of color to match adjacent surfaces; approved by surfacing tile manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. When installation location is near site boundary or property line, verify required location using property survey.

B. Verify that work area is ready to receive work:
   1. If existing conditions are not as required to properly complete the work of this section, notify Architect.
   2. Do not proceed with installation until deficiencies in existing conditions have been corrected.

C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.2 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's written instructions.
   1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
   2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.

B. Field Adjustment:
   1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
   2. Orient so dome pattern is aligned with the direction of ramp.
   3. Align truncated dome pattern between adjacent units.

C. Install units fully seated to substrate, square to straight edges and flat to required slope.

D. Align units so that tops of adjacent units are flush and joints between units are uniform in width.

3.3 INSTALLATION - CAST IN PLACE, CAST IRON PLATES

A. When installing multiple adjacent units, connect plates before placing.

B. Install by method described in manufacturer's written instructions.

C. Place units into wet concrete.

D. Press assembly into concrete to achieve final elevation.

E. Finish concrete adjacent to plate. Remove wet concrete spilled onto plate surface.

3.4 PROTECTION

A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.

B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION

SECTION 32 18 16.13
PLAYGROUND PROTECTIVE SURFACING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of existing protective surfacing and correction of grades as necessary.

B. Protective surfacing for playground area.

C. Subbase under resilient surfacing.

D. Containment curbs.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 32 33 44 - Playground Equipment: Playground layout (staking).

C. Section 32 11 23 - Aggregate Base Courses: Subbase for resilient surfacing.

D. Section 32 12 16 - Asphalt Paving: Subbase for resilient surfacing.

E. Section 32 13 13 - Concrete Paving: Subbase for resilient surfacing.

1.3 REFERENCE STANDARDS

A. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

B. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine; 2017.

C. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment; 2018.

D. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2017.

E. ASTM F2075 - Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment; 2015.

F. CPSC Pub. No. 325 - Public Playground Safety Handbook; 2010.

1.4 DEFINITIONS

A. Use Zone: The area beneath and immediately adjacent to a play structure or equipment (play event) that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

B. Critical Fall Height: The maximum fall height at which the protective surfacing meets the requirements of ASTM F1292.

C. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it as defined by ASTM F1487.

D. Protective Surfacing: Resilient ground surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or

the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.

E. Subbase: A layer under the resilient layer of the protective surfacing but over the subgrade; may be rigid, as in concrete or bituminous, or aggregate.

F. Subgrade: The surface of the ground on which the protective surfacing is installed.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements - Administrative Requirements, for submittal procedures.

B. Product Data: For all manufactured surfacing products, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, and safety limitations.
   1. Include IPEMA certifications where required.
   2. Treated Wood Products: Provide information on wood treatment chemical content, toxicity level, and life-cycle durability.

C. Product Data: For natural surfacing materials, provide supplier's certification or mill certificate showing compliance with specified requirements.

D. Samples: For each product for which color must be selected provide color chart showing full range of colors.

E. Maintenance Data:
   1. For manufactured surfacing products, provide manufacturer's recommended maintenance instructions and list of repair products, with address and phone number of source of supply.
   2. For loose fill surfacing products, provide detailed re-ordering information to enable Owner to match installed material exactly.

F. Manufacturer's Field Report.

1.6 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing products specified in this section, with not less than three years of documented experience.
   1. Manufacturer's Representative: Provide name, company name and address, and qualifications.

C. Installer Qualifications: Company certified by manufacturer for training and experience installing the protective surfacing; provide installer's company name and address, and training and experience certificate.

1.7 PRE-INSTALLATION MEETING

A. Coordinate with Section 32 33 44.

B. Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
   1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
   2. Include representatives of Contractor.
   3. Notify Architect at least 2 weeks prior to meeting.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store protective surfacing to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Submittals - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 PERFORMANCE CRITERIA

A. Because the safety of the playground depends on strict compliance with the performance criteria, this information is provided for Contractor's information.
   1. The protective surfacing constitutes a resilient layer installed over a non-resilient layer, which is installed over the subgrade, with the top of playground equipment footings and anchorage devices covered by full depth of the resilient portion of the protective surfacing.
   2. The total depth available for protective surfacing, from surface of subgrade, is indicated on drawings.
   3. The top elevation of the protective surfacing is intended to be flush with adjacent grades.

B. If deviation from specified depth is required, it is the Contractor's responsibility to make all changes required to maintain specified top elevation and required impact attenuation at no extra cost to Owner; obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

2.2 MATERIALS

A. Poured-In-Place Membrane Surfacing: Weather-resistant wear layer over impact attenuating substrate over aggregate subbase.
   1. Wear Layer: Ethylene propylene diene monomer (EPDM) particles adhered with a ultraviolet-stabilized polyurethane binder to produce an even, uniformly colored surface.
   2. Wear Layer Thickness: 3/8 inch, minimum.
   3. Coefficient of Friction, when wet: 0.8, minimum, when tested in accordance with ASTM D2047.
   4. Wear Layer Color(s): As selected from manufacturer's full range of bright colors.
   5. Impact Attenuating Substrate: 100 percent recycled shredded styrene butadiene rubber (SBR) shreds or granules with 100 percent solids polyurethane binder to form a resilient material; do not use foam rubber.
   6. Resilient Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
   7. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.
   8. Manufacturers:
      a. Landscape Structures, Inc: www.playlsi.com/#sle.
      b. No Fault Sport Group; No Fault Safety Surface for Playgrounds: www.nofault.com/#sle.
      c. Play Safe Surfacing, Inc : www.playsafesurfacing.com/#sle.
      d. Hanover Specialties Inc : www.vitriturf.com/#sle.

e. Substitutions: See Section 01 60 00 - Product Requirements.

B. Poured-In-Place Permeable Surfacing: Shredded rubber bonded with polyurethane adhesive, allowing water penetration, over aggregate subbase.
1. Rubber: 100 percent recycled shredded styrene butadiene rubber (SBR) shreds or granules.
2. Color: As selected from manufacturer's full range.
3. Resilient Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
4. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.
5. Manufacturers:
a. Landscape Structures, Inc: www.playlsi.com/#sle.
b. No Fault Sport Group; No Fault Bonded Rubber Mulch Surfacing for Playgrounds: www.nofault.com/#sle.
c. Play Safe Surfacing, Inc: www.playsafesurfacing.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Engineered Wood Fiber Fill: Manufactured for the purpose of protective surfacing; complying with ASTM F2075 and current ADA standards; do not use mulch manufactured from recycled pallets, or lumber containing nails or metal fasteners.
1. Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
2. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.
3. Manufacturers:
a. Fibar Systems: www.fibar.com/#sle.
b. GameTime, Inc: www.gametime.com/#sle.
c. Sof' Fall : www.sof-fall.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Geotextile: Nonwoven polypropylene sheet.

E. Aggregate Subbase: See Section 32 11 23.

PART 3 EXECUTION

3.1 PREPARATION FOR REPLACEMENT OF EXISTING LOOSE FILL SURFACING

A. Remove existing loose fill.

B. Measure the location of all playground elements, including perimeter of existing protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.

C. Stake the layout of the entire Use Zone perimeter before starting any work, based on Contract Documents.
1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
2. If overlaps exist, notify Architect.
3. Do not proceed until revised drawings have been provided, showing corrected layout.

D. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.

E. After subgrade is correct, mark intended depth of surfacing on the base supports of each item of playground equipment using paint or tape in a manner that will be easily verifiable during installation of surfacing.

F. Perform percolation test at the lowest elevation of the subgrade in the areas to be covered by protective surfacing.
   1. Report results to Architect.
   2. If percolation is less than 1 inch in a 3 hour period, do not proceed.

3.2 EXAMINATION

A. Playground equipment installer will perform playground layout prior to installation of footings; verify correctness of layout before starting this work.

B. Verify that playground equipment and site furnishings and irrigation system located within playground area are complete.

C. Verify location of underground utilities and facilities in the playground area. Damage to underground utilities and facilities will be repaired at Contractor's expense.

D. Verify that subgrades are at proper elevations and that smooth grading is complete.

E. Verify that proper depth of surfacing is marked on base supports of playground equipment.

3.3 PREPARATION

A. Correct subgrade irregularities to ensure that required depth of protective surfacing can be installed, and subgrade elevation is in accordance with manufacturer's requirements.

B. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.

C. Remove rocks, debris, and other similar items.

3.4 SUBBASE

A. Install aggregate subbase as indicated on drawings and in Section 32 11 23. Compact aggregate to maximum 95 percent, in accordance with ASTM D1557.

B. Install with top surface of subbase no higher than grades and levels indicated and not more than 1/4 inch lower than grades and levels indicated.

C. Install in true, even plane, sloped to provide positive drainage.

D. Flatness Tolerance: 1/4 inch in 10 feet, maximum.

3.5 RESILIENT SURFACING LAYER

A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).

B. Install proper thickness throughout Use Zone(s).

C. Clean and dry surface of subbase.

D. Cover aggregate subbase with geotextile:
   1. Verify that aggregate is free of ruts or protruding objects.
   2. Lap minimum 4 inches width at seams. Adhere seams in accordance with manufacturer's recommendations.
   3. Install smooth, and free of tensile stresses, folds, or wrinkles.
   4. Protect from clogging, tears, or other damage during surfacing installation.

5. Repair or replace damaged geotextile in accordance with manufacturer's recommendations.

E. Poured In Place Surfacing:
1. Mix components mechanically on-site in accordance with manufacturer's directions; do not mix by hand.
2. Install seamlessly; ensure complete bond to subbase.
3. Cover footings and foundations and adhere tightly around penetrating elements.
4. Maintain full thickness of resilient layers within Use Zone; cover or abut containment curbs as indicated on drawings; completely cover tapered transition edges.
5. Hand trowel exposed surface to smooth, even finish.
6. Impact Attenuation Layer: Install entire layer in one continuous pour on the same day.
7. Wear Surface: Bond wear surface to substrate with adhesive. Apply adhesive in small quantities so that wear surface can be applied before adhesive dries.
   a. Install surfacing seamlessly. When wear surface is composed of different color patterns, pour surface continuously and seamlessly.
   b. When seams are required due to color change or field conditions, place adjacent wear surface as soon as possible, before initial pour has cured. Coat edge of initial pour with adhesive and apply wear surface mixture immediately.
   c. Add a minimum of 1/16 inch depth to specified surfacing depth to ensure required impact attenuation performance is met.
   d. Install wear surface to cover foundations and adhere tightly around elements penetrating the surface.

3.6 LOOSE FILL SURFACING

A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, and requirements of authorities having jurisdiction (AHJ).

B. Cover Subgrade with Geotextile:
1. Lap minimum 4 inches width at seams. Adhere seams in accordance with manufacturer's recommendations.
2. Install smooth, and free of tensile stresses, folds, or wrinkles.
3. Protect from clogging, tears, or other damage during surfacing installation.
4. Repair or replace damaged geotextile in accordance with manufacturer's recommendations.

C. Install loose fill to depths indicated, with smooth even surface flush with tops of containment curbs.

3.7 FIELD QUALITY CONTROL

A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to the Contractor; submit report of field review.

B. Owner or Owner's representative will inspect playground surfacing after installation to verify that surfacing is of proper type and depth and that playground meets specified design safety and accessibility requirements.

C. Repair or replace rejected work until compliance is achieved.

3.8 CLEANING AND PROTECTION

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction.

E. Protect installed products until Date of Substantial Completion.

F. Replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 32 18 29
SYNTHETIC FIELD SPORT SURFACING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drainage Base Layer, including subgrade preparation, subbase stone and drainage pipe.

B. Synthetic Grass System for Athletic Field including carpet, shock pad, infill and markings.

C. Equipment for Maintenance of Synthetic Turf Surface System.

1.2 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading

B. Section 31 23 16 - Excavation

C. Section 31 23 23 - Fill

D. Section 32 11 23 - Aggregate Base Courses

E. Section 32 33 45 - Athletic Field Equipment

1.3 REFERENCE STANDARDS

A. ASTM D1335 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings; 2017, with Editorial Revision (2018).

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D2256/D2256M - Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method; 2010 (Reapproved 2015).

D. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016.

E. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils; 1963 (Reapproved 2007).

F. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2014).

G. ASTM D5823 - Standard Test Method for Tuft Height of Pile Floor Coverings; 2013.

H. ASTM D5848 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Coverings; 2010.

I. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a.

J. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

K. ASTM F1936 - Standard Specification for Impact Attenuation of Turf Playing Systems as Measured in the Field; 2010 (Reapproved 2015).

L. ASTM F2898 - Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-confined Area Flood Test Method; 2011 (Reapproved 2019).

M. NFHS (Guide) - Court and Field Diagram Guide; current edition.

N. STC (GCRI) - Guidelines for Crumb Rubber Infill Used in Synthetic Turf Fields; 2010, Revised (2014).

O. ASTM C88 - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

P. ASTM D1577 - Standard Test Method for Linear Density of Textile Fibers; 2007 (Reapproved 2018).

Q. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile fabrics (Grab Test).

R. ASTM F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces.

S. ASTM F3188 - Standard Specification for Extractable Hazardous Metals in Synthetic Turf Infill Materials.

T. Synthetic Turf Council - Suggested Guidelines for the Essential Elements of Synthetic Turf Systems

1.4 SUBMITTALS

A. Within 72 hours of Bid Opening, as requested, the Contractor shall submit:
   1. Three (3) copies of a list of references from 10 similar exterior installations of the specified material with comparable square footage to this project in the last five years.
   2. Three (3) copies of the required prepaid insurance policy supported from a third party, A.M. Best, A-rated or better domestic insurance carrier.
   3. Three (3) copies of the Product Data, Detailed Specifications and Literature for the synthetic turf system and the individual components, including but not limited to the fiber, primary and secondary backing, rubber infill materials, and adhesives. Submittal shall include all properties, characteristics, and testing results listed in this specification.
   4. One (1) boxed 10 x 10 inches minimum sample of proposed synthetic turf system. Box must allow visibility of the proposed turf section.
   5. One (1) 18 x 18 inches minimum sample of the carpet with the fiber in place, without infill, including the primary and secondary backing.
   6. The Contractor shall provide in writing the names of three (3) existing clients for whom significant after-the-sale service work has been performed or for whom the Contractor has performed Warranty Services.

B. Two (2) weeks prior to ordering of materials, the Contractor shall submit the following information below as a complete submittal. Because of the nature of the submittal, submittal review will not commence until all information is provided. All certifications, test results, shop drawings and other product information shall be checked and stamped as approved by the Contractor before submittal to the Architect.
   1. Samples:
      a. One (1) boxed 10 x 10 inches min. sample of the proposed synthetic turf system - illustrating details of the complete and finished synthetic turf system product. including the infill materials as proposed to be installed. Box must allow visibility of the proposed turf section.
      b. Two (2) - one quart samples of the sand infill material.
      c. Two (2) - one quart samples of the rubber infill material.

d. Two (2) - 18 x 18 inches min. samples of the carpet with the fiber in place, without infill, including the primary and secondary backing.
e. Two (2) - 6 x 12 inches min. samples of all available fiber colors for game lines and markings for final selection by the Owner.

2. Certifications, Five (5) copies each:
   a. Documentation certifying that the Contractor has an additional prepaid insurance policy in place from a third-party "A"-rated domestic insurance carrier in accordance with the requirements specified in the Quality Assurance Section of this specification.
   b. Sample Warranty: The Contractor and the Turf Manufacturer shall provide a sample copy of insured, non-prorated warranty and third-party insurance policy information which meets or exceed all of the warranty requirements defined in this specification.
   c. A signed letter from the Contractor and Turf Manufacturer that certifies:
      1) The products utilized for the synthetic turf system meet or exceed the specified requirements contained in this Specification and in the Contract Drawings. The letter shall include a written statement from the Turf Manufacturer detailing both the synthetic turf warranty period and the expected useful life of the turf.
      2) No lead or lead chromate components are utilized in the manufacturing of the turf system.
      3) The turf system complies with and meets the latest standards of the STC (GCRI) - Synthetic Turf Council guildines and recommendations for installation and rubber infill materials.
      4) The turf system does not violate any other manufacturer's patents, patents allowed or patents pending.
      5) All of the required manufacturing and installation experience and training certification requirements specified in the Quality Assurance Section of this specification will be met.
3. Documenation of Experience:
   a. Resume of Installation Supervisor who will be present on site throughout the duration of installation.
   b. Resumes of Designated Installation Crew.
   c. References for Contractor and Turf Manufacturer experience required in the Quality Assurance Section of this specification.
   d. Certification by Turf Manufacturer of designated installation crew and Installation Supervisor.
4. Turf Laboratory Test Results: Five (5) Certified copies of independent (third-party) laboratory testing reports for the following tests:
   a. Pile height, face width and total fabric weight - per ASTM D5848.
   b. Primary and secondary backing weights - per ASTM D5848.
   c. Tuft bind - per ASTM D1335.
   d. Grab tear strength - per ASTM D5034.
   e. Pill Burn test - per ASTM D2859.
5. Subbase and Chocker Stone Gradation Calculations and Laboratory Test Results, five (5) copies each:
   a. All testing and gradation calculations shall be performed by a certified independent testing firm - retained and paid for by the aggregate supplier.
   b. Gradation Test Results for aggregate materials defined in Section 2.1 Drainage Base Layer Materials of this specification.
   c. Maximum dry density attainable through the Standard Proctor compaction test, ASTM D698.
6. Financial Statements; The Contractor and the Turf Manufacturer - at the Request of the Architect, shall provide a current audited company financial statement for each of the past three (3) years.
7. Five (5) copies of all Product Data, Detailed Specifications and Literature shall be submitted for the overall synthetic turf system and the individual components, including but not limited to the fiber, primary and secondary backing, rubber infill materials,

drainage rate for complete installed system, adhesives, and the recommended field groomer. Submittal shall include all properties and characteristics listed in this specification. The Turf Manufacturer must submit the fiber manufacturer's name, type of fiber and composition of fiber.

8. Five (5) copies of Installation Procedures shall be submitted for the synthetic turf system and individual components.
9. Shop Drawings shall be submitted which include the following, five (5) copies each:
   a. Field Layout
   b. Field Marking Plans (in color), drawn to a scale of no greater than 1 inch = 30 feet with the required line and marking colors clearly shown, including all details and dimensions for all markings and their layout for the high school sports of Football, Soccer and Lacrosse. Provide individual plans for each sport and a composite plan that shows the lines and markings for all sports. Details shall be at a scale that provides a clear presentation.
   c. Roll/Seaming Layout Plan.
   d. Methods of attachment, field openings and perimeter conditions. Include all details for conditions where synthetic turf will be applied to covers, plugs, etc.

C. Prior to installation of the shock pad, the General/Site Contractor shall submit a minimum of three (3) copies of the following:
   1. An As-Built Topographic Survey of the Prepared Finishing Stone Aggregate shall be performed and submitted per the requirements of Field Quality Control Section of this specification.
   2. A signed letter that that planarity checks have been performed on the Finishing stone aggregate layer in accordance with the requirements of Section 3.1 Examination of this specification.

D. Prior to Final Acceptance, the Contractor shall submit a minimum of three (3) copies of the following:
   1. Field Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance for the synthetic turf system.
   2. Project Record Documents: Record actual locations of seams, anchors or other pertinent information.
   3. Warranty: Submit Manufacturer Warranty and ensure that forms have been completed in the Owner's name and registered with Manufacturer.

1.5 QUALITY ASSURANCE

A. Provide a full-time on-site Installation Supervisor to review and coordinate the installation of the entire synthetic turf system, including subgrade preparation, and installation of the subbase and drainage system. Installation Supervisor must be present on-site through the duration of the installation.

B. The Contractor shall meet the following criteria:
   1. Substantiate the ability to secure bonding capacity in excess of $1,000,000 for this project.
   2. Demonstrate a track record where the Surety or Bonding Company has not been required to finish work.
   3. Demonstrate a financial strength to fully service and warrant the systems during the period of the warranty.

C. Manufacturer/Installer's Experience:
   1. The Turf Manufacturer must be experienced in the manufacture and installation of this specific type of artificial turf system and provide references of this specific synthetic turf from 100 similar exterior installations, 15 of which must have occured in the State of New York, of the specified material with comparable square footage to this project.
   2. The Contractor must have actively been in business, under its current name and ownership for at least the past five years; and must have a minimum of 25 sythentic turf

fields in the United States that are currently in use and have been in use for at least five years.

3. The Contractor must provide competent workmen skilled in this specific type of synthetic turf installation.
   a. The designated Installation Supervisor on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing, cutting, gluing, shearing seams, proper installation of the infill mixture and brushing operations. This supervisor must be certified by the distrubutor and have installed at least 25 synthetic turf systems of a similar size in the past 5 years.
   b. The designated installation crew shall be certifed in writing by the Turf Manufacturer and have installed at least 25 synthetic turf systems of a similar size in the past 5 years.
4. The Contractor shall have a representative on-site to certify the installation and warranty compliance.
5. The Contractor and/or Turf Manufacturer shall not have had a surety or bonding company finish work on any contract within the last 3 years.
6. The Contractor and/or Turf Manufacturer shall never have been disqualified or barred from performing work from any public entity.

1.6 WARRANTY

A. The Contractor and Turf Manufacturer shall provide a warranty to the Owner that includes the following in writing:
   1. The turf warranty shall be from a single source, single policy and shall provide full coverage for all defects in all materials and workmanship of the synthetic turf system for its intended usability and playability for a period of ten (10) years from the date of Final Completion and acceptance of the turf field. The Turf Manufacturer must verify that their on-site representative has inspected the installation and that the work conforms to the manufacturer's requirements.
   2. In addition to the Contractor's/Manufacturer's single source warranty, an additional prepaid insurance policy supported from a third party, A.M. Best, A-rated or better domestic insurance carrier shall be provided. The insurance policy and manufacturer warranty shall be written specifically naming the field being constructed as part of this project and shall additionally require payment of a claim to be made directly to the Owner of said field. Evidence of such coverage must be submitted and approved.
   3. The turf warranty shall include general wear and damage caused from ultra-violet degradation.
   4. The turf warranty shall specifically list what components and properties are covered by the warranty. The list shall include but not be limited to any and all defects or failures relating to construction of the synthetic turf system, drainage through the synthetic turf system, synthetic turf seam rupture, synthetic turf yarn ultraviolet stability; excessive wear and tensile strength.
   5. The turf warranty shall cover defects in the workmanship of installation and further warrants that the installation was done in accordance with both the manufacturer's recommendations and any written directives of the manufacturer's on-site representative.
   6. The turf warranty shall include all necessary materials, labor, transportation costs, etc., to complete repairs or replacements. The warranty shall guarantee the availability of the same or better replacement materials for the synthetic turf system for the warranty period. The turf warranty must cover full replacement value of the total square footage installed including removal and disposal of failed turf system.
   7. The turf warranty shall be non-prorated and shall not place limits on the amount of field's usage.
   8. The turf warranty shall clearly define the conditions under which the manufacturer considers the warranty to be void.
   9. The turf warranty shall define the typical time frame within which repairs will be initiated by the synthetic Contractor, once notice has been received requesting repairs.

10. The warranty shall guarantee the G-max ratings at the completion of construction and for the duration of the warranty as described in this specification.

B. All designs, markings, layouts, and materials shall conform to all currently applicable National Federation State High School Association rules and other standards that may apply to this type of synthetic turf installation.

C. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields used for sports listed previously. The materials as hereinafter specified, should be able to withstand full climatic exposure in the State of New York; be resistant to insect infestation, rot, fungus and mildew; to ultra-violet light and heat degradation, and shall have the basic non clogging characteristic of flow through drainage allowing free movement of surface run-off through turf where such water may flow through the gravel blanket and into the field drainage system. The adhesive bonding and sewn seams of all system components shall provide a permanent, tight secure and hazard free athletic playing surface. All sheared and glued adhesive bonded and sewn seams shall, at a minimum, remain in place throughout the duration of the warranty period.

1.7 FIELD QUALITY CONTROL

A. Aggregate Material Testing: The Contractor responsible for the installation of the stone base shall retain and pay for the services of an independent testing agency, subject to approval by the Owner, to provide the following testing services. If any tested material is found to be non-compliant with the requirements of the Contract Documents, the Contractor shall bear the cost of correcting the non-compliant condition, including if necessary, the removal of all non-compliant material from the project site and replacement of the materials to comply with the required specifications. All re-testing associated with noncompliant material shall be paid for by the Contractor.
   1. In-Place Density Testing: Density testing shall be performed on the installed and prepared dynamic base stone in accordance with ASTM D6938. One density test will be performed per 2,500 SF of placed dynamic base stone.
   2. The installed subbase shall drain at a rate of not less than 100 inches per hour.
   3. Gradation Testing: Gradation testing shall be performed on the dynamic base stone delivered to the project site in accordance with ASTM D422, Standard Test Method for Particle Size Analysis of Soils.
   4. Additional Testing: The Owner reserves the right to request that additional tests be performed that are deemed necessary to confirm that the installation of materials associated with the new synthetic turf playfield system comply with the requirements of tile Contract Documents.

B. As-Built Survey: The Contractor installing the aggregate base shall provide an as-built survey of the final compacted finishing stone deplicting the grades within the synthetic turf field area in half foot contours. The survey shall be performed and signed by a licensed Surveyor, Registered in the State of New York. The drawing shall be developed at a scale of 1 inch = 20 feet. The survey shall depict elevations in a grid pattern with maximum intervals between survey points of 20 feet in both directions, including elevations along the field crown line and perimeter boundary. Each survey point number and its corresponding elevation shall be shown on the as·built drawing using an established project bench mark. If any high and low spots are identified, adjustments shall be made by Contractor providing the aggregate base by adding or removing material to conform to the specified planarity and grades. Repair areas shall be re-graded and re-compacted to the specified tolerances prior to installing the finishing stone layer of the aggregate base course.

C. Shock Attenuation Evaluation
   1. G max Rating Requirements for Synthetic Turf System:
      a. G max Rating Testing shall be performed in accordance with ASTM F1936.
      b. Testing shall be paid for by the Contractor and performed by an Independent Testing Agency approved by the Owner.

c. G max Rating: No single test shall exceed 200g, and the average G max rating shall not exceed 165g.

2. At the Substantial Completion of each Turf System, perform ten (10) in place G max tests at locations to be determined by the Owner and/or Architect. If any test results do not comply with the G max Rating Requirements specified, take corrective action as necessary to achieve satisfactory results. Perform additional testing to verify the results as directed by the Architect.
3. During Warranty Period, the Owner reserves the right to have the field tested for shock attenuation at its own cost at any time it deems necessary. If at any time, the G-max Rating does not comply with the G-max Rating Requirements specified, it is the responsibility of the Contractor to take corrective action as necessary to achieve satisfactory results. If the G max rating the allowable limits after three attempts to repair the high rating, replace the field including disposal and removal of existing surface within 90 calendar days at no cost to the Owner.

D. Infill Depth: Measurement of infill by Independent Testing Agency, approved by the Owner, to verify depth shall be taken at a minimum of ten (10) locations throughout each installed playfield. The amount of installed infill shall in all cases meet the minimum specified depth with an allowable tolerance of plus or minus ¼ inch.

1.8 MAINTENANCE

A. The synthetic Contractor shall provide training for the Owner regarding the recommended maintenance program for the synthetic turf field. The training shall include a detailed review of the turf maintenance manual required to be provided by the synthetic turf manufacturer.

B. Maintenance shall include site visit three months after installation and add/subtract infill material to account for typical break-in condition. Adjust Owners grooming equipment at time of installation and as necessary during the first three months of use to create optimum performance.

C. Extra Materials: Upon final completion, provide the following materials directly to the Owner in the minimum quantities specified:
1. Seaming Tape - 200 LF
2. Seaming Epoxy - One standard sized pail.
3. Turf fabric - 500 SF with at least one piece 15 feet wide by 10 feet long.
4. 4 inch Wide Colored Fabric - Minimum 100 LF of each color specified for inlaid linestriping.
5. 2,000 pounds of ground rubber infil in weatherproof containers.

PART 2 PRODUCTS

2.1 DRAINAGE BASE LAYER MATERIALS

A. Geotextile Filter Fabric: Non-woven polypropylene geotextile fabric. Mirafi 140N or approved equal as shown on drawings.

B. Geotextile Stabilization Fabric: Woven polypropylene geotextile fabric. Mirafi 500X or approved equal as shown on drawings.

C. Drainage Pipe: Oblong corrugated HDPE pipe meeting ASTM D7001, having nominal dimensions of 1.5 by 12 inches, an inlet area of approximately 15 square inches per foot, and wrapped in a geotextile filter fabric. ADS AdvanEDGE with Geotextile Wrap or approved equal.

D. Base Stone Aggregate Material: AASHTO #57 clean washed stone at a minimum depth of five (5) inches or per Turf Manufacturer recommendations.

Sieve	Approximate Percent Passing
1-1/2"	100%
1"	95-100%
1/2"	25-60%
#4	0-10%
#8	0-5%

E. Finishing Stone Aggregate Material: Crushed limestone blend, clean washed stone at a minmum depth of one (1) inch or per Turf Manufacturer recommendations.

Sieve	Approximate Percent Passing
1/2"	100%
3/8"	95-100%
#4	70-85%
#8	45-60%
#16	25-40%
#100	8-15%
#200	0-5%

2.2 SYNTHETIC GRASS SYSTEM

A. General Carpet Requirements:
1. Shall have the characteristics of a flow-through drainage system allowing free movement of surface run-off through the turf and directly into the prepared aggregate base and into the field drainage system, The system and all components shall be non-toxic with respect to the users and the environment.
2. Face Yarn Type: 100% U.V. resistant polyethylene blended multifilament system consisting of rigid monofilament strands and parallel-long slit film fibers.
3. Primary Backing: Double layered polypropylene porous fabric treated with U.V. inhibitors.
4. Secondary Backing: Porous, heat activated urethane to permanently lock fiber tufts in place.
5. Color: As shown on drawings and approved by Owner.
6. Alternating shade 25%/75% and 75%/25%.
7. Construction: Broadloom tufted.
8. Furnished in 15' wide rolls of sufficient length to extend from side line to sideline without splices and including white perimeter line and 5 yard football lines tufted into each role.
9. Head seams are only acceptable at sidelines.
10. Turf panels including sideline panels and inlaid markings, must be sewn, glued panel seams are not acceptable.
11. All markings are to be factory tufted or inlaid at the project site. No line painting will be allowed.

B. Minimum Carpet Properties:
1. Minimum Yarn Linear Density: minimum 5,000 denier for slit-film fibers and minimum 7,200 denier for rigid monofilament. (ASTM D1577)
2. Minimum Yarn Thickness: 100 microns for slit-film fibers and 240 microns for rigid monofilament.
3. Minimum Yarn Breaking Strength: 33 lbs. nominal. ASTM D2256/D2256M
4. Pile Height: 2.25 inches nominal. ASTM D5823
5. Minimum Pile Weight - 43 oz/sy minimum. ASTM D5848
6. Minimum Primary Backing Weight - 7.0 oz/sy minimum. ASTM D5848
7. Minimum Secondary Backing Weight - 16 - 22 oz/sy. ASTM D5848

8. Minimum Total Product Weight: 75 oz/sy. ASTM D5848
9. Minimum Tuft Bind: 9 lbs/force without infill. ASTM D1335
10. Minimum Grab Tear (width): >200 lbs/force (ASTM D5034)
11. Minimum Grab Tear (length): >200 lbs/force (ASTM D5034)
12. Maximum Relative Abrasiveness Index: 25 (ASTM F1015)
13. Minimum Permeability: 20 inches/hour. (ASTM D4491)
14. Flammability (Pill Burn): Pass ASTM D2859
15. Maximum Yarn Elongation: 40% nominal.
16. Minimum Stitch Rate: 9/3 inch.
17. Maximum Tufting Gauge: 3/4 inch.

C. General Resilient Infill Requirements:
1. Controlled resilient layered granular mixture, partially covering carpet, consisting of graded clean silica sand and processed rubber crumb.
2. Minimum Weight: 6 lbs per square foot.
3. Infill Depth: 1.75 inches deep minimum.
4. Infill Sand: Specifically-graded dust-free silica sand. The sand shall be delivered to the site graded, washed and dried. The sand particles shall be rounded to sub-angular so as to minimize abrasion to the athlete and synthetic turf fibers.
5. Infill Rubber: Ambiently processed, hammer-milled clean, dust-free, contaminant free and metal-free SBR rubber crumb. The SBR particles shall be processed and sized under rigid specifications and in accordance with the Turf Manufacturer's quality control program.
6. Infill materials must meet or exceed ASTM F3188 requirements.
7. Infill material to be supplied by an SBR crumb rubber manufacturer.

D. Accessories: Glue, thread, paint, seaming fabric and other materials used to install and mark the synthetic turf surfacing system shall be provided as recommended by the Turf Manufacturer.

E. Nailer: Pressure Treated wood nailer provided at all edges as shown on drawings and detail. See unit pricing.

PART 3 EXECUTION

3.1 PRE-CONSTRUCTION MEETINGS:

A. An interview shall take place at a time and date to be determined by the Architect. Present at this meeting shall be the Architect, Landscape Architect, Owner's Representative(s), the Project Manager and Site Superintendent for the Prime Contractor and the Project Manager and Project Foreman for the Contractor. The purpose of this meeting will be to review turf product and installation means and methods, to interview and ascertain the experience and competence of the Turf Manufacturer, as well as, the on-site Project Foreman for this project and to review the project schedule. Contractor shall submit all required submittals, warrantees and insurance at or before this meeting.

B. A second meeting shall take place at a time and date to be determined by the Architect. Present at this meeting shall be the Architect, Landscape Architect, Owner's Representative(s), and the Project Manager for the Site Contractor. The purpose of this meeting shall be to review and confirm schedule. (with particular attention on the turf installation) and to confirm that the turf product has been ordered by way of notarized copies of the original confirmed Purchase Order and guaranteed delivery date.

3.2 GENERAL REQUIREMENTS

A. The Contractor shall strictly adhere to the installation procedures outlined under this and following sections. Any variance from these requirements must be accepted in writing, by the Contractor and Turf Manufacturer, and submitted to the Architect/Owner, verifying that the changes do not in any way affect the warranty.

B. Do not install synthetic turf system when ambient temperature is below 45 degrees F, above 110 degrees F, if materials are wet, or if rain is falling or pending. Materials can be installed under dry conditions only.

C. Notify the Architect when each major component is near completion for review prior to proceeding to next operation.

3.3 PREPARATION

A. Excavation: Site Contractor shall excavate natural grass field, topsoil, and subsoil as necessary to meet the subgrade elevations and established in the Contract Documents plans and details. See 31 23 16 - Excavation for related requirements.

B. Refer to 31 22 00 - Grading, and 31 23 23 - Fill for related requirements.

C. The subgrade shall be sloped at a minimum of 0.5% to mirror final field grades, unless otherwise directed in the plans and details. Subgrade is to be sloped toward the drainage piping at the perimeter of the field.

D. Subgrade shall be proof rolled and compacted to a minimum of a 90% compaction rate. Nofity Archtitect if soils not able to acheive the proper compaction. Areas which cannot acheive the proper compaction shall be over-excavated and structural fill shall be installed, recompacted, and retested.

E. Excess and unsuitable soils shall be removed from the project site.

F. Site Contractor shall install all conduit and other utility piping in accordance with the plans, details, and appropriate specifications, including required backfilling, compaction and testing.

3.4 DRAINAGE BASE LAYER INSTALLATION

A. Install geotextile fabric over excavated and prepared subgrade. Provide a 36 inch minimum overlap at all seams. The entire field shall be covered with fabric prior to the base aggregate application.

B. Contractor shall install oblong corrugated lateral drainage pipes on geotextile fabric as shown on the plans and connect to perimeter drain pipes.

C. Base Stone: The installation of the base stone shall only begin after the drainage pipe installation has been inspected and approved by the Architect. Installation of the Free Draining Base Stone shall follow procedures that protect the subgrade soils and drainage pipe. The drainage pipe network and its existing elevations shall not be disrupted through ground pressures from trucks, dozers or by any other means.
   1. The subgrade shall be dry before undertaking the placement of base stone.
   2. Delivery trucks shall enter the field only from the designated entrance point. Base stone shall be dumped closest to the entrance first and continuously worked towards the furthest point of the field. Extreme care must be taken not to disturb subgrade or drainage network.
   3. Track-type dozers shall push out the stone from behind the pile onto and toward the field center. Dozers shall only traffic the aggregate they are spreading.
   4. Bulldozer blades shall be equipped with a laser-guided hydraulic system. Care shall be taken not to disturb or contact the subgrade soils with the dozer blades or tracks. All

equipment trafficking over the drainage aggregate shall insure there is a minimum depth of 4 inches of aggregate between the geotextile fabric and the dozer track ground contact position.

5. When the stone spreading is completed, the surface shall be further-firmed by a 5-ton roller. Static vibration shall not be part of this process.
6. The stone shall be left firm, but not over-compacted as to protect the porosity and drainage capabilities of the aggregate profile.
7. After the base stone has been uniformly spread throughout the surface, the surface shall receive a final laser finished grade. This process shall be accomplished using a turf-type tractor, or lightweight grader, equipped with high flotation tires and a hydraulically controlled laser blade.
8. Verify the compaction of the base stone course is 95% according to the Modified Proctor procedure ASTM D1557, and that the surface tolerance does not exceed ¼ inch over 10 feet and ½ inch from design grade. The synthetic Contractor shall provide a minimum of 48 hours notice to the Owner and the Architect prior to scheduling final compaction or planarity testing.

D. Finishing Stone Aggregate: The installation of the finishing stone shall only begin after the base stone has been inspected and approved by the Architect.
   1. The finishing stone layer shall be applied using laser-controlled low ground pressure grading equipment.
   2. Arrange for the inspection of the Finishing Stone and curbs using a laser level and plot on a 10 foot topographical grid. Based on this topographical survey, arrange for the suitable fine grading of the Finishing Stone area, including proper rolling and compacting.
   3. Final layer of stone must be installed at a depth as indicated on drawings. Finished aggregate base must be proof-rolled by means of 2- to 5-ton roller. It shall also be flush with top of nailer.
   4. Notify the Architect prior to the commencement of fine grading, for a visual inspection of Finishing Stone condition. If contamination or disturbance of the Base Stone is evident, remove finishing stone as directed by Architect for inspection and testing of Base Stone.
   5. Provide grading and compaction to the lines, grades, slopes and typical sections indicated on the Contract Drawings. Compact the finishing stone within the range of 90% dry density attainable through the Standard Proctor compaction test ASTM D698. It is necessary to maintain the compaction within this range to provide stability also to maintain the permeability characteristics of the prepared material. Take precautions and use the appropriate equipment to avoid over-compaction of the finishing stone aggregate. Perform compaction operations in both directions.
   6. Planarity tolerance for the completed finishing stone aggregate installation is ¼ inch over 10 feet from any given point in any direction, as measured with a 10- foot long straightedge. Finished grade of the prepared finishing stone shall not deviate by more than 1/8 -inch from the extrapolated design grade. This tolerance is required over the entire field.
   7. A planarity check letter shall be performed and a certification shall be submitted by the Contractor.
   8. Additionally, an as-built survey in accordance with this specification shall be performed.
   9. Arrange for Turf Manufacturer to inspect and certify that the finishing stone area to receive the synthetic turf surfacing is ready for installation of the underlayment shock pad; is perfectly clean as the installation commences; and will be maintained in that condition throughout the installation process.
   10. Stone base installing Contractor to preform field permeability testing according to ASTM F2898 - Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-confined Area Flood Test Method. Results to be submitted to Architect for approval piror to proceeding.
       a. Minimum allowable permeability rates:
          1) New fields: 16 inches per hour.
          2) Existing fields being recovered: 10 inches per hour.

11. When the Contractor confirms conditions as being acceptable to ensure proper and timely installation of the work and to ensure requirements of applicable warranties or guarantees can be satisfied, submit written confirmation to the Architect. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to the installer.

3.5 RESILIENT UNDERLAYMENT SHOCK PAD INSTALLATION

A. Installation of underlayment shock pad shall be in strict accordance with the manufacturer's instructions, site specific recommendations, and industry best practices.

B. After the finishing stone grades have been approved and inspected, the resilient Shock Pad shall be installed from sideline to sideline.
   1. Equipment and personnel shall take extreme care to minimize disturbance of the finishing stone during Shock Pad installation.
   2. All operations shall work from behind the Shock Pad or from adjacent, pre-installed pad surface.
   3. For rolled Shock Pads, one head seam shall be allowed per length. Head seams shall be staggered so as not to be within 10 feet of the previously installed roll.
      a. The head seam shall overlap approximately 4 inches on original roll out. Second and subsequent rolls shall be rolled out within 1 inch, or less, of the previous roll and allowed to expand or contract before manually sliding in place.
      b. After allowance for expansion or contraction, the padding shall slide into place so as to touch the edge or seam of the previous. Care shall be taken so as not to disturb the finishing stone material when butting the seams together.

C. The Resilient ShockPad shall not receive a final cut or edging detail until the material has relaxed/expanded in direct sunlight for a minimum of six hours.
   1. No open seams shall exceed 1/4 inch (in expanded state) after final seam or end cutting is complete.
   2. Padding material shall stop just short of the exposed nailer board.

D. The Resilient ShockPad shall be inspected by the Contractor after completion to insure the surface is smooth with only minor bumps from stone particles or other material protruding from underneath that will not show up once the turf is laid over top.
   1. Expansion bubbles and open seams shall be repaired prior to final inspection.
   2. Repeat inspections shall be carried out prior to each roll of synthetic turf being installed.

E. At completion of the Shock Pad installation, notify Architect for review three (3) days before proceeding with installation of subsequent component.

3.6 SYNTHETIC GRASS CARPET INSTALLATION

A. After a final inspection of the Resilient ShockPad by the Turf Manufacturer Representative and the Architect, the synthetic turf installation shall begin.

B. The rolls of turf shall be rolled out a minimum of four hours prior to starting seaming procedures and allowed to relax/expand.
   1. All visible wrinkles shall be stretched out before seaming.
   2. Seams shall be flat, tight and permanent with no separation or fraying.
   3. Synthetic turf yarn fabric that is trapped or glued between seams shall be freed from the seams by hand or other approved method to an upright position prior to the commencement of brushing and top dressing procedures.

C. Lay full width rolls across the field of sufficient length to permit full cross field installation from sideline to sideline without head or cross seams in the main playing area between sidelines. The first roll shall begin with the longest perpendicular cross-field distance.

D. Provide 99% sewn installation. Minimal gluing will be permitted to repair problem areas, corner completions, and to cut in any logos or Inlaid lines as required. All seams shall be sewn using double bagger stitches and polyester thread or adhered using seaming tape and high grade adhesive per the manufacturer's standard procedures. Make all seams flat, tight and permanent without separation or fraying.

E. GLUING OF ROLLS SHALL NOT BE ACCEPTABLE.

F. When all rolls of the playing surface have been attached, install sideline areas at right angles to the playing field synthetic turf area.

G. Install synthetic turf for the covers of the power/communication boxes, plugs for the drainage system clean outs, filler plug covers for the football goal posts and any other "in-ground" components within the limits of the synthetic turf field.

H. Attach the synthetic turf surfacing to the perimeter edge as detailed on the Contract Documents and in strict accordance with the Turf Manufacturer's standard recommendations.

3.7 FIELD MARKINGS

A. Standards:
1. All designs, markings, layouts, field lines and materials for indicated sports previous in accordance with the current National Federation of State High School Associations NFHS (Guide) "Rules Book" for each sport.
2. All lines and markings for the sports of indicated previously.
3. All preliminary colors of field lines and markings are included in the Contract Documents. Final color selection will be made by the Owner.

B. For the purpose of developing the Contract Bid Price, the Contractor shall assume that all field lines are independent of each other and that no common field lines will be permitted. In all instances where field lines for different sports are defined to be in the same location the lines shall be tufted or inlaid directly adjacent to each other. Installation of common sport field lines will be considered as part of a playfield linestriping shop drawing provided by the contractor during the submittal process.

C. If NFHS (Guide) rules provide a range of acceptable line widths, the contractor shall include the cost to provide the widest for the bid price, unless specifically indicated otherwise on the Contract Documents. The final determination of line widths shall be made during the review of submittals.

D. Inlay center logo as indicated on the Contract Documents. Final color selections to be during the shop drawing process.

E. The following are additional line striping requirements
1. Football:
a. Rules Manuals: All field lines and markings for the sport shall be in accordance with the current NFHS (Guide) Rules Manual and per the Contract Documents.
b. Perimeter Field Boundary Lines: All sidelines and end lines shall be 4 inches wide. All other lines and markings shall be 4 inches wide unless specifically indicated otherwise in the rules manual or the Contract Documents.
c. Type of Markings; The individual 5 yard lines, goal lines, end lines and side lines shall be factory tufted.
d. Miscellaneous Markings: Individual 10 yard numbers and directional arrows, individual 1 yard hash marks located along the sidelines and at the inbound locations at the interior middle third points of the field, all inbound hash marks, extra point lines, kick off marks, home and visitors coaches boxes, home and visitors team boxes and other lines and markings defined in the current rules manuals shall be inlaid or tufted.
2. Soccer:

a. Rules Manuals: All field· lines and markings for the sport shall be in accordance with the current NFHS (Guide) Rules Manual and per the Contract Documents.
b. Field Linestriping: All lines shall be 4 inches wide unless specifically indicated otherwise in the rules manual or within the Contract Documents.
c. Miscellaneous Field Lines: Tufted or inlaid,
d. Center Marking: Inlaid 9 inch diameter spot. Color selections to be during the shop drawing process.
e. Corner Kick Encroachment Line: Inlaid, 1 yard long hash marks perpendicular to the goal line outside the field of play 11 yards from each of the 4 corners of the field to assist officials encroachment during corner kicks.

3. Boy's Lacrosse
   a. Rules Manuals: All field· lines and markings for the sport shall be in accordance with the current NFHS (Guide) Rules Manual and per the Contract Documents.
   b. Field Linestriping: All lines shall be 4 inches wide unless specifically indicated otherwise in the rules manual or within the Contract Documents.
   c. Miscellaneous Field Lines: Tufted or inlaid,
   d. Center Marking: Inlaid 9 inch diameter spot. Color selections to be during the shop drawing process.
4. Girl's Lacrosse
   a. Rules Manuals: All field· lines and markings for the sport shall be in accordance with the current US Lacrosse standards as outlined in the "Official Rules for Girl's and Women's Lacrosse" and per the Contract Documents.
   b. Field Linestriping: All lines shall be 4 inch wide unless specifically indicated otherwise in the rules manual or within the Contract Documents.
   c. Miscellaneous Field Lines: Tufted or inlaid,
   d. Center Marking: Inlaid 9 inch diameter spot. Color selections to be during the shop drawing process.
5. Box Lacrosse
   a. Rules Manuals: All field· lines and markings for the sport shall be in accordance with the current US Lacrosse standards as outlined in the "Official Rules for Box Lacrosse" and per the Contract Documents.
   b. Field Linestriping: All lines shall be 4 inch wide unless specifically indicated otherwise in the rules manual or within the Contract Documents.
   c. Miscellaneous Field Lines: Tufted or inlaid,
   d. Center Marking: Inlaid 9 inch diameter spot. Color selections to be during the shop drawing process.

F. Inlaid lines, markings, and logos are to be installed by shearing and gluing and in accordance with the requirements of the Turf Manufacturer. The primary and secondary backing are not to be cut when installing inlaid lines.

G. At completion of the carpet and markings installation, notify Architect for review three (3) days before proceeding with installation of subsequent component.

3.8 INFILL MATERIAL INSTALLATION

A. Apply infill materials in numerous thin lifts. Install infill to a 1 3/4 inch depth at the weight specified for the manufacturer minimum 6 lbs per sq ft 3 lbs sand and 3 lbs rubber. Place infill with a 1/2 inch void to the top of the fibers.

B. Install Infill materials to fill voids between the fibers and to allow the fibers to remain vertical and non-directional.

C. Between applications, the infill area shall be brushed with a motorized rotary nylon broom.

D. Install infill to a 1.75 inch depth at the weight specified by the Turf Manufacturer. Place infill with a 1/2 inch void to the top of the fibers.

E. The Contractor shall have the depth of infill confirmed in accordance with the testing requirements specified herein. Results shall be provided to the Architect.

F. The Contractor shall re-visit site three months after installation and add/subtract infill material to account for typical break-in condition. Adjust grooming equipment at time of installation and as necessary during the first three months of use to create optimum performance.

G. At substantial completion, the Contractor shall notify the Architect for final inspection and review. The Shock Attentuation Evaluation specified herein shall be scheduled after final inspection has been completed and punch list items addressed.

3.9 CLOSEOUT

A. The Contractor and Turf Manufacturer must verify that their on-site representative has inspected the installation and that the work conforms to the manufacturer's requirements.

B. The Contractor shall provide Shock Attentuation Evaluation in accordance with this specification, and certify that it meets the specified G-max criteria.

C. The Contractor and Turf Manufacturer shall provide the submittals required, including any required warranty, maintenance manuals, and as-built striping layout.

3.10 CLEAN UP

A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items.

B. All usable remnants of new material shall be neatly rolled up and turned over to the Owner, if desired, at a place and area designated by the Owner.

C. During the contract and at intervals as directed by the Architect and as synthetic turf installation is completed, clear the site of all extraneous materials, rubbish, or debris and leave the site in a clean, safe, well draining, neat condition.

D. Surfaces, recesses, enclosures, etc., shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END OF SECTION

SECTION 32 31 13
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Posts, rails, and frames.

B. Wire fabric.

C. Concrete.

D. Manual gates with related hardware.

E. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.3 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

C. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2011a (Reapproved 2017).

D. ASTM A428/A428M - Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles; 2010 (Reapproved 2014).

E. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric; 2011 (Reapproved 2017).

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

H. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2019a.

I. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2014a.

J. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric; 2017.

K. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework; 2018.

L. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2018.

M. CLFMI CLF-FIG0111 - Field Inspection Guide; 2014.

N. CLFMI CLF-PM0610 - Product Manual; 2017.

O. CLFMI CLF-SFR0111 - Security Fencing Recommendations; 2014.

P. CLFMI WLG 2445 - Wind Load Guide for the Selection of Line Post and Line Post Spacing; 2018.

Q. FS RR-F-191/1D - Fencing, Wire and Post Metal (Chain-Link Fence Fabric); 1990.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

D. Manufacturer's Installation Instructions: Indicate installation requirements, post foundation anchor bolt templates, and shop drawings.

E. Manufacturer's Qualification Statement.

F. Fence Installer Qualification Statement.

G. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Chain Link Fences and Gates:
   1. Master-Halco, Inc.: www.masterhalco.com.
   2. Merchants Metals: www.merchantsmetals.com.
   3. Wheatland Tube Company:www.wheatland.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

A. Line Posts:
   1. Up to 6 feet high: 1.9 inch O.D.
   2. Up to 8 feet high: 2.375 inch O.D.

B. Corner and Terminal Posts:
   1. Up to 6 feet high: 2.375 inch O.D.
   2. Up to 8 feet high: 2.88 inch O.D.

C. Gate Posts:

Gate Fabric Height Up To & Including 6 ft		Gate Fabric Height Over 6 ft To 12 ft	
Gate Leaf Width	Outside Diameter	Gate Leaf Width	Outside Diameter
up to 4 ft	2.375 in	up to 6 ft	2.875 in
over 4 ft to 10 ft	2.875 in	over 6 ft to 12 ft	4.000 in
over 10 ft to 18 ft	4.000 in	over 12 ft to 18 ft	6.625 in
		over 18 ft to 24 ft	8.625 in

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.

E. Bottom Rail: 1.66 inch diameter, plain end, sleeve coupled.

F. Gate Frame: 1.66 inch diameter for welded fabrication.

G. Fabric: 2 inch diamond mesh interwoven wire, 9 gauge, 0.1483 inch thick, top selvage knuckle end closed, bottom selvage knuckle end closed or equivalent.

H. Fabric with Pre-Inserted Slats: 2 inch diamond mesh interwoven wire, 6 gauge, 0.1920 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.
   1. Privacy Slats: High-density polyethylene (HDPE), woven into fabric.
      a. Visual Barrier: 95 percent.
      b. Slat Color: Gray.

I. Tension Wire: 7 gauge, .177 inch thick steel, single strand.

J. Tension Band: 3/16 x 3/4 inch thick, minimum cast steel, galvanized.

K. Tension Strap:.196 inch thick, minimum cast steel, galvanized.

L. Tie Wire: 9 gauge aluminum core; vinyl coated to 6 gauge.

2.3 MATERIALS

A. Posts, Rails, and Frames: Formed from hot-dipped galvanized steel sheet, ASTM A653/A653M, HSLAS, Grade 50, with G90 (Z275) zinc coating.

B. Line Posts: Type I round in accordance with FS RR-F-191/1D.

C. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round in accordance with FS RR-F-191/1D.

D. Wire Fabric Vinyl Coated:
   1. ASTM A392 zinc coated steel chain link fabric.
   2. Comply with CLFMI CLF-PM0610.
   3. Where wire gauge is indicated for fabric, the gauge shall refer to the wire (core) prior to vinyl coating.

E. Concrete:
   1. Type specified in Section 03 30 00.

2.4 MANUAL GATES AND RELATED HARDWARE

A. Hardware for Single Swinging Gates: 180 degree box hinges, 2 for gates up to 60 inches high, 3 for taller gates; strong arm latch.

B. Hardware for Double Swinging Gates: 180 degree box hinges, 2 for gates up to 60 inches high, 3 for taller gates; strong arm latch.

C. Hardware for Double Swinging Vehicle Gates: 180 degree box hinges, 2 for gates up to 60 inches high, 3 for taller gates; strong arm latch, drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp.

D. Hinges: Finished to match fence components.
   1. Brackets: Round.
   2. Mounting: Center.
   3. Closing: Manual.

E. Latches: Finished to match fence components.
   1. Locking: Mechanical.

2.5 ACCESSORIES

A. Caps: Cast steel galvanized; Vinyl coated sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; Cast Steel Galvanized.

C. Privacy Slats: High-density polyethylene (HDPE) strips, sized to fit fabric weave.
   1. Products:
      a. PrivacyLink; Ultimate Slats: www.eprivacylink.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 FINISHES

A. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.

B. Accessories: Same finish as framing.

C. Color(s): Black.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.2 PREPARATION

A. Removal: Obstructions or debris.

3.3 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Place fabric on outside of posts and rails.

C. Set intermediate posts plumb, in concrete footings with top of footing 3 inches below finish grade. Slope top of concrete fr water runoff.

D. Line Post Footing Depth Below Finish Grade: ASTM F 567.

E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F 567.

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

H. Install center brace rail on corner gate leaves.

I. Do not stretch fabric until concrete foundation has cured 7 days.

J. Stretch fabric between terminal posts or at intervals of 500 foot maximum, whichever is less.

K. Position bottom of fabric 2 inches above finished grade.

L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

N. Install bottom tension wire stretched taut between terminal posts.

O. Do not attach the hinged side of gate to building wall; provide gate posts.

P. Install hardware and gate with fabric to match fence.

Q. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

C. Do not infringe on adjacent property lines.

3.5 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.

C. Post Settings: Randomly inspect three locations against design for:
   1. Hole diameter.
   2. Hole depth.
   3. Hole spacing.

D. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.

E. Gates: Inspect for level, plumb, and alignment.

F. Workmanship: Verify neat installation free of defects. See CLFMI CLF-FIG0111 for field inspection guidance.

3.6 CLEANING

A. Leave immediate work area neat at end of each work day.

B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

C. Clean fence with mild household detergent and clean water rinse well.

D. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.

E. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

3.7 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Demonstrate proper operation of equipment to Owner's designated representative.

C. Demonstration: Demonstrate operation of system to Owner's personnel.
1. Use operation and maintenance data as reference during demonstration.
2. Conduct walking tour of project.
3. Briefly describe function, operation, and maintenance of each component.

D. Training: Train Owner's personnel on operation and maintenance of system.
1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.
3. Location: At project site.

END OF SECTION

SECTION 32 32 23
SEGMENTAL RETAINING WALLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Segmental retaining walls made of modular concrete units with or without soil reinforcement.

B. Shop drawings.

C. Retaining wall units.

D. Shear connectors.

E. Soil reinforcement.

F. Drainage filter.

G. Aggregate for leveling pad.

H. Concrete for leveling pad.

I. Drainage fill.

J. Reinforced backfill.

K. Drainage pipe.

1.2 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Rough and finish grading.

B. Section 31 23 16 - Excavation.

C. Section 31 23 23 - Fill.

1.3 REFERENCE STANDARDS

A. AASHTO M 288 - Standard Specification for Geosynthetic Specification for Highway Applications; 2017.

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2018a.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM C1262/C1262M - Standard Test Method for Evaluating the Freeze-Thaw Durability of Dry-Cast Segmental Retaining Wall Units and Related Concrete Units; 2016.

F. ASTM C1372 - Standard Specification for Dry-Cast Segmental Retaining Wall Units; 2017.

G. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction; 2012 (Reapproved 2017).

H. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

I. ASTM D1241 - Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses; 2015.

J. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

K. ASTM D2166/D2166M - Standard Test Method for Unconfined Compressive Strength of Cohesive Soil; 2016.

L. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017.

M. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017, with Editorial Revision (2018).

N. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014 (Reapproved 2018).

O. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2017.

P. ASTM D4595 - Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method; 2017.

Q. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.

R. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2016.

S. ASTM D5262 - Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics; 2007 (Reapproved 2016).

T. ASTM D5321/D5321M - Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear; 2017.

U. ASTM D5818 - Standard Practice for Exposure and Retrieval of Samples to Evaluate Installation Damage of Geosynthetics; 2011.

V. ASTM D6638 - Standard Test Method for Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units (Modular Concrete Blocks); 2018.

W. ASTM D6706 - Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil; 2001 (Reapproved 2013).

X. ASTM D6916 - Standard Test Method for Determining the Shear Strength Between Segmental Concrete Units (Modular Concrete Blocks); 2018.

Y. ASTM D7928 - Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis; 2017.

Z. NCMA TR-127 - Design Manual for Segmental Retaining Walls; 2010, Third Edition.

AA. NCMA TR-160 - Seismic Design Manual for Segmental Retaining Walls; National Concrete Masonry Association; 1998.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section with the material supplier, installer, and the Architect.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Segmental Retaining Wall Units:
   1. Manufacturer's product data.
   2. Installation methods.

C. Soil Reinforcement:
   1. Manufacturer's product data.
   2. Installation methods.

D. Shop Drawings: Engineering drawings for installation, including elevations, large-scale details of elevations, typical sections, details, and connections, soil reinforcement, and drainage provisions.
   1. Include marked up contract drawings showing exact dimensions for blocks, required coping, and other minor revisions.
   2. Design Data: Submit detailed design calculations showing compliance with specified design criteria and material evaluations performed in accordance with specified design standard, signed and sealed by Design Engineer.
   3. Submit no less than 2 weeks prior to start of work.
   4. Obtain approval of Architect prior to start of work.

E. Soil Reinforcement to Unit Connector: One connector.

F. Design Engineer's Qualification Statement.

G. Concrete Unit Manufacturer Qualification Statement.

H. Installer Qualification Statement.

1.6 QUALITY ASSURANCE

A. Design Engineer Qualifications: Provide design by or under direct supervision of Professional Engineer experienced in the work of this section and licensed in the State of New York and:
   1. Having minimum of five years documented experience in design of reinforced soil structures.
   2. Employed by firm that has designed a minimum of 500,000 square feet of segmental retaining walls.
   3. Having minimum of $2,000,000 aggregate liability insurance.

B. Geotechnical Engineer: Employed by Owner; licensed in the State of New York.

C. Manufacturer Qualifications -- Concrete Units: Firm specializing in manufacturing products specified in this section and:
   1. With not less than 2 years experience.
   2. Whose products have been used on a minimum of five successfully completed projects similar in scope and size.
   3. Having a minimum of 1,000,000 square feet of successfully completed retaining walls.

D. Installer Qualifications: Firm specializing in design and installation of segmental retaining walls and:
   1. With not less than 2 years documented experience.
   2. With a minimum of five previously constructed successful projects, similar in size and magnitude, using specified retaining wall system; provide contact names and numbers.
   3. Having site supervisor with verifiable qualified experience suitable for this project.

1.7 MOCK-UP

A. Prior to erection of retaining walls, provide mock-up for evaluation of installation workmanship.

B. Erect 4 by 4 feet sample wall using materials specified.

C. Retain mock-up during construction as standard for judging completed work. Do not alter or destroy mock-up until work is completed.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products above ground on wood pallets or blocking, in manufacturer's unopened packaging, until ready for installation.

B. Prevent excessive soil and mud from coming in contact with face of concrete units.

C. Protect material from damage. Do not use damaged material. Remove damaged material from the site.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for Segmental Retaining Wall.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Segmental Retaining Walls:
1. Anchor Wall Systems, Inc: www.anchorwall.com/#sle.
2. Keystone Retaining Wall Systems LLC: www.keystonewalls.com/#sle.
3. Rockwood Retaining Walls: www.rockwoodwalls.com/#sle.
4. Unilock: www.unilock.com/#sle.
5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 RETAINING WALLS

A. Contractor is responsible for design of the retaining walls.

B. Design Standard: Design retaining walls to be capable of withstanding the effects of gravity loads due to soil pressures resulting from grades indicated, determined in accordance with:
1. In addition, comply with applicable local, state, and federal codes and regulations.
2. This design method considers potential failure modes categorized by external, internal, local, compound, and global stability.
3. Provide engineering services as required for analysis for all modes of stability.
4. Use of design software for calculations is permitted.
5. Submit complete shop drawings showing all features of the design.

C. Setback: 1/8 inch back from face per course minimum. Per product recommendation.

D. Mass (Weight) Per Wall Face Area: 35 pounds per square foot, minimum, including filled voids.

E. Shear Resistance: Design the wall not to exceed the capacity of materials and soils to resist shear:
   1. Shear Resistance Between Units: Determine in accordance with ASTM D6916.
   2. Connection Between Units and Soil Reinforcement: Determine in accordance with ASTM D6638. Strength shall exceed the maximum tensile force with a Factor of Safety of 1.5.
   3. Coefficient for Direct Shear of Reinforcement on Soil: Determine in accordance with ASTM D5321/D5321M using soil similar in gradation and texture to that to be used for fill in the reinforced zone.

F. Soil Reinforcement:
   1. Test reinforcement to be used in accordance with ASTM D6706 using soil taken from project site.
   2. Do not use more than one type of reinforcement attached to units within the same wall; do not use products made by different manufacturers in the same wall; minimize the number of different reinforcement and filter products to avoid confusion in placement.
   3. Walls Less Than 12 feet High: Use only one type of reinforcement of one grade and strength.
   4. Length Back from Wall: Not less than dimensions shown on drawings.
   5. Long Term Design Strength of Reinforcement: LTDS = Tult / (RFd x RFid x RFcr), where:
      a. Tult = Ultimate (tensile) strength per ASTM D4595.
      b. RFd = Reduction Factor for chemical and biological durability; minimum 2.0 if durability testing has not been conducted, otherwise 1.1 for High-density polyethylene. (HDPE), and 1.1 for polyethylene terephthalate (PET).
      c. RFid = Reduction Factor for Installation Damage; minimum 1.1 and 3.0 if testing per ASTM D5818 has not been conducted.
      d. RFcr = Reduction Factor for Creep; consistent with test procedure used for determining the ultimate strength per ASTM D5262.
      e. The product RFd x RFid x RFcr shall be greater than 2.0.

G. Drainage: Design to prevent water accumulation in retained soil; use drainage fill and drainage pipe as specified in Section 33 41 00; provide outlets at 50 foot intervals along length of wall, minimum.

H. Minimum Factor of Safety: Design with the following stability requirements:
   1. Sliding = 1.5.
   2. Pullout = 1.5.
   3. Tensile Overstress = 1.5.
   4. Overturning = 2.0.
   5. Bearing Capacity = 2.0.

2.3 MATERIALS

A. Retaining Wall Units: Machine-formed concrete blocks of shapes and sizes suitable for the retaining wall configuration required and complying with ASTM C1372 and the following:
   1. Face Color: Natural cement gray.
   2. Texture: Split face, on exposed surfaces.
   3. Face Shape: Straight (flat).
   4. Curved Walls: Provide unit shapes that accommodate the required curves without cutting and with gaps between faces of adjacent units of not more than 1/8 inch and a minimum radius of 3 1/2 feet.
   5. Height: 4 inches, minimum.
   6. Length (Face Width): 8 inches, minimum.
   7. Width (Depth from Face): 11 inches, minimum, not including textured finish.
   8. Face Wall Thickness: 2 inches, minimum.
   9. Batter Dimensional Control: Provide integral positive control to maintain consistent batter dimension.
   10. Shear Resistance Mechanism: Manufacturer's standard.

11. Moisture Absorption: 8 percent, maximum.
12. Freeze-Thaw Resistance: Maximum of 1 percent or less weight loss after 100 cycles for each of 5 specimens or maximum of 1.5 percent or less weight loss after 150 cycles for 4 of 5 specimens, when tested in accordance with ASTM C1262/C1262M.
13. Compressive Strength, 28 Day: 3000 pounds per square inch, minimum in accordance with ASTM C140/C140M.
14. Concrete Density: 125 pounds per cubic foot, minimum, oven dry.
15. Dimensional Tolerances: Plus/minus 1/16 inch from specified dimension.
16. Appearance: No visible chips, cracks, or other imperfections when viewed from 10 feet under diffuse lighting.

B. Shear Connectors: Connection method to withstand design stresses and prevent movement of segmental retaining wall units, and to hold soil reinforcement in proper design position during grid pre-tensioning and backfilling.
   1. Flexural Strength: 128,000 pounds per square inch, minimum, determined in accordance with ASTM D6638.
   2. Short Beam Shear: 6,400 pounds per square inch, minimum, determined in accordance with ASTM D6638.
   3. Maintain strength over design temperature range of minus 10 degrees F to plus 100 degrees F.

C. Soil Reinforcement: Polymeric geosynthetic specifically fabricated to interlock with surrounding soil, rock, or earth for use as reinforcement, dimensionally stable and able to retain geometry under manufacture, transport, and installation.
   1. Polymeric Material: 100 percent virgin resin with maximum of 5 percent in-plant regrind material; polypropylene, polyethylene, or polyester.
      a. Polyethylene and Polypropylene: Stabilized with long term antioxidants.
      b. Polyester: Minimum molecular weight of 25,000 and carboxyl end group number less than 30.
   2. Construction: Woven.
   3. Permittivity: 0.5 per second, minimum, when tested in accordance with ASTM D4491/D4491M.
   4. UV Resistance: 70 percent after 500 hours, when tested in accordance with ASTM D4355/D4355M.
   5. Durability: Comply with minimum requirements of AASHTO M 288 Class 1; minimum mass of 8 ounces per square yard.

D. Drainage Filter: Geosynthetic textile.
   1. Apparent Opening Size: 70 to 100 U.S. Sieve size, when tested in accordance with ASTM D4751.
   2. Permittivity: 0.5 per second, minimum, when tested in accordance with ASTM D4491/D4491M.
   3. Durability: Comply with minimum requirements of AASHTO M 288 Class 1; minimum mass of 8 ounces per square yard.

E. Aggregate for Leveling Pad: Compacted sand, gravel, or crushed rock complying with one of the following:
   1. As specified in Section 31 23 23.
   2. Meeting requirements of ASTM D1241, Gradation C.
   3. Do not use pea gravel.

F. Concrete for Leveling Pad: Unreinforced concrete with compressive strength of 3,000 pounds per square inch.

G. Drainage Fill: Clean, freely draining aggregate placed within, between, or immediately behind segmental retaining wall units; do not use pea gravel; use one of the following:
   1. Aggregate as approved by Architect.
   2. Aggregate meeting requirements of ASTM D448, Size No. 57.

3. Crushed stone or coarse gravel, 3/8 inch; no more than 5 percent passing No. 200 sieve.
4. Crushed stone or coarse gravel, meeting requirements of ASTM D7928.

H. Reinforced Backfill: Compacted soil placed behind drainage fill within reinforced soil mass; do not use heavy clay or organic soils; comply with one of the following:
1. Use site-excavated or other soil approved by Architect.
2. Granular soil with less than 35 percent passing No. 200 sieve per ASTM D7928.
3. Inorganic ASTM D2487 soil types GP, GW, SP, or SM, free of debris.
a. Maximum Size: 3/4 inch, unless approved by Design Engineer, and design strength reduced to account for additional installation damage.
b. Plasticity of Fines: Less than 10. Liquid Limit: Less than 40, when tested in accordance with ASTM D4318.

I. Drainage Pipe: 4 inch Perforated schedule 40 PVC, complying with ASTM D3034; or corrugated HDPE complying with ASTM F405; with geotextile filter wrap.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify location of existing structures and utilities prior to excavation.

B. Protect adjacent structures from the effects of excavation.

C. Verify that layout dimensions are correct and substrate is in proper condition for installation.

D. Notify Architect of unsatisfactory conditions.

E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Sitework:
1. Remove unwanted trees, bushes, and debris as specified in Section 31 10 00.

B. Excavation:
1. Excavate to lines and grades indicated on drawings.
2. Do not disturb embankment or foundation beyond lines. Minimize over-excavation; fill over-excavated areas with compacted reinforced backfill or leveling pad material at Contractor's expense.
3. After excavation, and prior to placement of leveling materials, Geotechnical Engineer will examine bearing soil surface to verify strength meets or exceeds design requirements and assumptions.
4. Replace unsuitable bearing soil as directed by Architect.
5. Provide means of controlling surface water away from excavation during construction.
6. Perform rough and finish grading as specified in Section 31 22 00.

C. Leveling Pad:
1. Depth: As indicated.
2. Width: 6 inches minimum extension beyond front and back faces of units.
3. In lieu of pad made solely of aggregate or concrete, pad may be 3 inches, minimum, of thick compacted sand or crushed rock, covered with 2 inches to 3 inches of unreinforced concrete.
4. Location: Top of pad at 1 inch below grade for each 8 inches that wall extends above grade.
5. Compact aggregate to lines and grades on drawings, in lifts 6 inches thick, maximum.

6. Compact aggregate to a minimum of 90 percent modified Proctor density, when determined in accordance with ASTM D1557.
7. Use only hand-operated compaction equipment within 36 inches of back of wall.

D. Verify level grade before proceeding.

E. Install drainage collection pipe with a continuous fall in the direction of flow. Cap open ends as necessary to prevent soil and debris from entering.

3.3 INSTALLATION

A. Install in accordance with drawings, manufacturer instructions, and applicable codes and regulations.

B. Segmental Retaining Wall Units:
1. Place first course of units on leveling pad; check alignment and level. Check for full contact with base and for stability.
2. Place units side by side for full length of wall, aligning back face of straight walls using string line or offset from base line and back face of curved walls using flexible pipe or other method recommended by manufacturer.
3. Do not leave gaps between units.
4. Lay out corners and curves in accordance with manufacturer's instructions. Do not leave gaps to produce wall batter or curvature.
5. Cut blocks with saw; do not split units.
6. Sweep excess material from tops of units before laying succeeding courses.
7. Place a maximum of 2 succeeding courses above level backfill. Check for proper alignment and batter.
8. Where top of wall changes elevation, step units to match grade or turn top course into embankment.
9. Where bottom of wall changes elevation, step base leveling pad and extend lowest course a minimum of two units into slope.
10. Install shear connectors per manufacturer recommendations.

C. Soil Reinforcement: Install each layer on fully compacted fill.
1. Orient soil reinforcement material with highest strength axis perpendicular to wall alignment.
2. Attach to top of wall units and extend horizontally, full length, over compacted backfill slightly sloping downward away from wall.
3. Install in one piece lengths with 100 percent coverage in each layer at each level. Do not splice or leave gaps between panels or ends of pieces.
4. Pull taut and remove slack prior to backfill placement.

D. Drainage Fill: Place drainage fill in, between, and behind units.
1. Compact to lines and grades on drawings, in lifts 6 inches thick, maximum; decrease lift thickness where necessary to achieve required density.
2. Extend drainage fill 6 inches beyond back face of units.
3. Base of drainage fill elevation shall not exceed two courses or 16 inches from base of wall units.

E. Backfill: Place, spread, and compact backfill from behind drainage fill to undisturbed soil while minimizing the development of slack in the soil reinforcement.
1. Use only lightweight hand-operated compaction equipment within 3 feet from back wall face, or one half of wall height, whichever is greater.
2. Place backfill in lifts of maximum 6 inches to 8 inches loose thickness where hand compaction is used and 8 inches to 10 inches where heavy compaction equipment is used.
3. Compact backfill to 95 percent maximum density and upper 2 feet of backfill to 98 percent maximum density, standard Proctor, as determined in accordance with ASTM D698, or as recommended by Geotechnical Engineer.

4. Moisture content of backfill prior to and during compaction to be within plus or minus 2 percentage points dry of optimum and uniform throughout each layer.
5. Do not operate tracked construction equipment directly upon soil reinforcement. Maintain a minimum fill thickness of 6 inches for operation of tracked vehicles over soil reinforcement. Minimize turning of tracked vehicles while over soil reinforcement.
6. Operate wheeled equipment at speeds less than 10 miles per hour over soil reinforcement.
7. Prevent contamination of the filter fabric, unit fill, blanket drains, chimney drains, and/or drainage composite from poor drainage materials such as fine grained silt and clay.

F. Site Drainage:
1. At end of each day:
   a. Grade backfill a minimum of 2 percent away from wall to prevent runoff from adjacent areas from entering wall site and to prevent ponding at the wall.
   b. Construct a berm at the crest of the wall to prevent surface water from overtopping.
2. At completion, if other work adjacent to wall is not to be done immediately (paving, landscaping, etc), grade top of backfill and provide temporary drainage to prevent water runoff toward the wall.
3. Surface water control and groundwater seepage shall be the responsibility of the project Architect.

3.4 TOLERANCES

A. Top of Wall:
1. Plan Location: Maximum of plus/minus 1 inch from plan location.
2. Elevation: Maximum of plus/minus 1-1/2 inch from elevations shown on drawings.

B. Face of Wall Flatness: Measured as deviation from a straight edge.
1. In the Vertical Dimension: Plus/minus 1-1/4 inch per 10 foot section.
2. In the Horizontal Dimension of Straight Walls: Plus/minus 1-1/2 inch per 10 foot section.

C. Overall Wall Batter: Within 2 degrees of design, measured from the vertical.

D. Gap Between Adjacent Units: 1/8 inch, maximum.

3.5 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Provide manufacturer's field representative to observe and inspect concrete units.

C. Observe and inspect:
1. Concrete units: For correct type, for quality installation with courses that are level and follow the designed batter ratio.
2. Soil backfill: For correct type, for specified compaction with level grading prior to reinforcement installation.
3. Soil reinforcement: For correct type, for solid connection to concrete units, and for smooth and taut installation.
4. Field location in plan and elevation.

D. Soil Tests: For every new soil type and/or for every 2,000 cubic yard per running foot perform Atterberg Limit, Sieve Analysis, and Proctor Compaction tests. Perform additional testing per project Architect.

E. Owner will engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. Contractor will secure necessary construction control testing during construction.

F. Correct work found deficient and not in accordance with drawings and specifications.

3.6 CLEANING

A. Clean wall face to remove debris and stains.

B. Leave adjacent paved areas broom clean.

3.7 PROTECTION

A. Prevent damage to wall and earthwork by subsequent construction and uncontrolled runoff until substantial completion; repair damage due to failure to protect wall or earthwork.

B. Do not operate equipment with wheel loads in excess of 150 pounds per square foot live load within 10 feet from the wall face.

C. Do not place temporary soil or fill stockpiles adjacent to wall.

END OF SECTION

SECTION 32 33 00
SITE FURNISHINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Benches.

B. Tables.

C. Waste receptacles.

D. Recycling receptacles.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

PART 2 PRODUCTS

2.1 METAL FURNISHINGS

A. Benches: Metal frame and seat section with back.
   1. Frame: Steel.
   2. Seat: Steel slat.

3. Length: 96 inches.
4. Mounting: Surface.

B. Waste Receptacles: Steel frame with steel slats and fixed lid and hinged side-opening door.
1. Capacity: 20 gallons.
2. Shape: Square.
3. Inserts: Removable plastic containers for waste material.
4. Lids:
   a. Material: Steel.
   b. Type: Rain shield.
5. Mounting: Surface.

C. Recycling Receptacles: Steel frame with steel slats and fixed lid and hinged side-opening door.
1. Capacity: 20 gallons.
2. Shape: Square.
3. Inserts: Removable plastic containers for recycling material.
4. Signage: Manufacturer's standard; indicate receptacle is for recycling only with words and symbols.
5. Lids:
   a. Material: Steel.
   b. Type: Rain shield.
6. Mounting: Surface.

D. Metal Tables and Seating:
1. Frame: Steel.
2. Slats: Steel.
3. Seating: Compliant with ADA Standards.
4. Shape: Rectangle.
5. Mounting: Surface, using concealed anchor rods.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.

B. See Section 05 50 00 for anchors to attach site furnishings to mounting surfaces.

3.2 INSTALLATION

A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

B. Provide level mounting surfaces for site furnishing items.

END OF SECTION

SECTION 32 33 44
PLAYGROUND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Playground layout (staking).

B. Playground equipment.

C. Location of each item of playground equipment is indicated on drawings.

1.2 RELATED REQUIREMENTS

A. Section 32 18 16.13 - Playground Protective Surfacing: Protective surfacing in playground area.

1.3 DEFINITIONS

A. Play Event: A piece of playground equipment that supports one or more play activities.

B. Use Zone: Area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.

C. Fall Height: Vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F1487.

D. Protective Surfacing: Resilient ground surfacing, specified in Section 32 1816.13. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.

E. Subgrade: Surface of the ground on which the protective surfacing is installed; the subbase for the protective surfacing is installed over the subgrade.

1.4 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A135/A135M - Standard Specification for Electric-Resistance-Welded Steel Pipe; 2009 (Reapproved 2014).

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

D. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2018.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

G. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test; 2005, with Editorial Revision (2012).

H. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment; 2018.

I. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2017.

J. CPSC Pub. No. 325 - Public Playground Safety Handbook; 2010.

K. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
   1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
   2. Include representatives of Contractor.
   3. Notify Architect at least 2 weeks prior to meeting.

1.6 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.
   1. Certifications: Provide International Play Equipment Manufacturers Association (IPEMA) certification that product complies with ASTM F1487, excluding section 10 and 12.6.1.

C. Shop Drawings: Detailed scale drawings showing play event layout, Use Zone perimeters, and fall height for each play event.
   1. Show locations and dimensions of footings and anchorage points.
   2. Clearly identify mounting elevations in relation to a fixed survey point on site and to subgrade elevation and depth of protective surfacing.
   3. Show locations of underground utilities, storm drainage system and irrigation system.
   4. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.

D. Samples: For each item that a color must be selected, provide color chart showing full range of colors and finishes.

E. Maintenance Data: Provide manufacturer's recommended maintenance instructions and list of replaceable parts for each equipment item, with address and phone number of source of supply.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing materials and products specified in this section, with not less than three years of experience.

1. Provide documentation showing that playground equipment similar to that specified has been installed in at least ten sites and in successful service for at least five years; provide addresses.
2. Provide certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.
3. Manufacturer's Representative: Provide product rep's name, company name and address, and playground safety training certificate.

C. Installer Qualifications: Company certified by manufacturer for training and experience installing play events and equipment.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store equipment to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Playground Equipment:
1. Landscape Structures, Inc: www.playlsi.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PLAYGROUND EQUIPMENT - GENERAL

A. Design Assumptions: Because the safety of the playground depends on strict compliance with design criteria, this information is provided for Contractor's information.
1. Playground has been designed for children ages 2 to12 (Elementary) and 5 to 12 (IJ).
2. Playground equipment shall include ADA elements.
3. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

B. Mount equipment on concrete footings, unless otherwise indicated.
1. Playground protective surfacing constitutes a resilient layer installed over a subbase (non-resilient) that is installed over subgrade; top of footings and anchorage devices is to be covered by full depth of resilient portion of protective surfacing.
2. Protective Surfacing Depth: As indicated on drawings.
3. Provide supports as required to mount equipment at proper height above finish and sub-grades to allow installation of sufficient depth of protective surfacing; portion of support below top of surfacing must comply with specified requirements for equipment.
4. Paint portion of support that is intended to be installed below top surface of protective surfacing a different color, or mark in other permanent way, so that installers and maintainers of protective surfacing can easily determine whether sufficient depth has been installed.

C. Provide permanent label for each equipment item stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F1487.

2.3 PLAYGROUND EQUIPMENT

A. Comply with ASTM F1487 and CPSC Pub. No. 325; provide equipment complying with specified requirements for relevant age group(s).
   1. Provide components having factory-drilled holes; do not use components with extra holes that will not be filled by hardware or covered by other components.

2.4 MATERIALS

A. Steel Pipe and Tube: Comply with ASTM A135/A135M, ASTM A500/A500M, or ASTM A513/A513M; hot-dipped galvanized and free of excess weld and spatter.
   1. Tensile Strength: 45,000 psi, minimum.
   2. Yield Point: 33,000 psi, minimum.
   3. Galvanizing: Hot-dip metal components in zinc after fabrication, in accordance with ASTM A123/A123M; remove tailings and sharp protrusions and burnish edges.

B. Extruded Aluminum: ASTM B221 or ASTM B221M, Alloy 6061, 6062, or 6063.
   1. Tensile Strength: 39,000 psi, minimum.
   2. Yield Point: 36,500 psi, minimum.

C. Hardware: Provide without hazardous protrusions, corners, or finishes, and that require tools for removal after installation; countersunk fasteners are preferred.
   1. Use stainless steel for metal-to-metal connections; select type to minimize galvanic corrosion of materials connected by hardware.
   2. Use stainless steel for wood-to-wood and wood-to-metal connections.
   3. Use stainless steel with plastic components.
   4. Bearings: Self lubricating.
   5. Hooks, Including S-Hooks: Closed loop; maximum gap 0.04 inches, less than the thickness of a dime.
   6. Rails, Loops, and Hand Bars: Same metal as item is mounted on or aluminum; with powder coating.
   7. Anchors: In accordance with manufacturer's recommendations.

D. Boards and Timbers: Free of holes, cracks, and loose knots; do not use wood or wood coatings that contain pesticides; do not utilize used lumber.

E. Powder Coating for Steel: Electrostatically applied and oven cured polyester powder over electrostatic zinc coating.

F. Polyvinyl Chloride (PVC) Coating: Ultraviolet (UV) stabilized and mold-resistant; slip-resistant finish; prime parts to be coated with clear acrylic thermosetting solution, and preheat prior to dipping in liquid PVC.
   1. Thickness: 0.08 inch, minimum, plus/minus 0.02 inch.
   2. Hardness: 85 durometer, when tested in accordance with ASTM D3363.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Verify that playground area has been graded to subgrade elevations required and that excess soil, rocks, and debris have been removed.

B. Verify location of underground utilities and facilities in playground area; damage to underground utilities and facilities will be repaired at Contractor's expense.

3.2 PREPARATION

A. Stake location of playground elements, including Use Zone perimeters, perimeter of protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.

B. Stake layout of entire Use Zone perimeter before starting any work and before subbase under resilient surfacing is laid.
   1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
   2. Verify that Use Zones are free of obstructions that would extend into resilient portion of protective surfacing.
   3. If conflicts or obstructions exist, notify Architect.
   4. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.

3.3 INSTALLATION

A. Installation of equipment shall be completed by manufacturer's certified installer only.

B. Coordinate work with preparation for and installation of protective surfacing specified in Section 32 18 16.13; install protective surfacing after playground equipment installation.

C. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).

D. Anchor equipment securely below bottom elevation of resilient surfacing layer.

E. Install without sharp points, edges or protrusions, entanglement hazards, pinch, crush, or shear points.

F. Do not modify play events on site without written approval of manufacturer.

G. Install required signage if not factory-installed.

3.4 FIELD QUALITY CONTROL

A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to the Contractor; submit report of field review.

B. Certified playground installer is responsible for obtaining third party safety audit after installation to verify that playground meets specified design safety and accessibility requirements.

C. Repair or replace rejected work until compliance is achieved.

3.5 CLEANING

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction (AHJ).

3.6 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 32 33 45
ATHLETIC FIELD EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Basketball Equipment

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

B. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.

1.3 REFERENCE STANDARDS

A. NFHS (Guide) - Court and Field Diagram Guide; current edition.

B. NYSPHSAA - New York State Public High School Athletic Association.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers product data prior to actual field installation work, for Architect's or Owner's representatives review.

C. Shop Drawings: Provide drawings of the manufacturers recommended installation and foundation requirements prior to actual field installation work, for Architect's of Owner's representatives review.

D. Manufacturer's Installation Instructions: Indicate special considerations or requirements for proper installation.

E. Specimen Warranty.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. The Contractor shall furnish a warranty that the equipment and all parts thereof shall be first class and free from defects and the manufacturer will, upon notice and without undue delay, without expense to Owner, make good or repair the whole or any part of the equipment furnished by him which shall, within two years from the date of acceptance of the completed

work, fail or develop unfitness for the purpose which is intended, as a result of any defect in design, material or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Douglas Sports Equipment; 800-553-8907: www.douglas-sports.com.

B. Or Approved Equal.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 BASKETBALL

A. Basketball System - Adjustable:
   1. Model D-Pro 646 Max, #69672 by Douglas Sports, Inc.
      a. Or Approved Equal.
   2. Goal:
      a. 42 inch x 72inch Heavy-duty 0.5 inch thick tempered glass backboard.
         1) Aluminum perimeter frame with welded steel back frame.
         2) Pre-molded vinyl backboard padding.
      b. 5/8 inch x 18 inch steel rim with double spring breakaway goal, with hidden net attachment hooks.
   3. Frame:
      a. 6 x 6 inch steel pole with 3/16 inch wall thickness.
      b. Reinforced 4 foot extension arms.
      c. Black polyester powder coat finish.
      d. Removable handle.
      e. Locking capability.
      f. Anchoring system.
      g. Adjustable Height of 5.5 to 10 foot.
   4. Included Accessories:
      a. Wraparound pole padding.
      b. No exposed baseplate bolts

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that all site work related is adequate.

B. Verify that fields are laid out in accordance with the NYSPHSAA - New York State Public High School Athletic Association and NFHS (Guide)

3.2 INSTALLATION

A. Equipment shall be installed by experienced workmen in exact accordance with the manufacturer’s specifications and approved shop drawings.

B. Equipment shall be installed to the location, dimension and alignment in accordance with the contract drawings and/or accepted standards for the specific.

C. Equipment shall be installed in accordance with NYSPHSAA - New York State Public High School Athletic Association and NFHS (Guide) - National Federation of High School Associations - Court and Field Diagram Guide; current edition.

3.3 CLOSEOUT ACTIVITIES

A. Demonstrate proper operation of equipment to Owner's designated representative.

B. Demonstration: Demonstrate operation of system to Owner's personnel.
   1. Use operation and maintenance data as reference during demonstration.
   2. Briefly describe function, operation, and maintenance of each component.

C. Training: Train Owner's personnel on operation and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.

3.4 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

END OF SECTION

SECTION 32 92 19
SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Seeding, mulching and fertilizer.

D. Maintenance.

1.2 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

B. Section 31 23 23 - Fill: Topsoil material.

1.3 REFERENCE STANDARDS

A. ASTM D7322/D7322M - Standard Test Method for Determination of Erosion Control Product (ECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions; 2017.

1.4 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Topsoil samples.

C. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

E. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer .

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.7 QUALIFICATIONS

A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum five years documented experience.

PART 2 PRODUCTS

2.1 SEED MIXTURE

A. Seed Mixture: General Lawn Areas, Evergreen Professional 80/20 mix by Banfield Baker or approved equal
   1. 40% Diva Kentucky Bluegrass
   2. 40% Guinness Kentucky Bluegrass
   3. 10% Palmer IV Perennial Ryegrass
   4. 10% Double Time Perennial Ryegrass

2.2 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.

2.3 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

B. Mulching Material: Pelleted, biodegradable, dry recycled paper fiber, free from weeds, formulated to absorb and release water continually during seeding establishment.
   1. Integral tackifier and starter fertilizer.
   2. Manufacturer:
      a. Lebanon Turf; PennMulch: www.lebanonturf.com.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

D. Erosion Fabric: Jute matting, open weave. Provide on all disturbed slopes of 3:1 or greater.

2.4 TESTS

A. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

B. Submit minimum 10 oz sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.

C. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.2 PREPARATION

A. Prepare subgrade in accordance with Section 31 22 00.

B. Place topsoil in accordance with Section 31 22 00.

3.3 FERTILIZING

A. Apply fertilizer at a rate of soil analysis recommendations.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.4 SEEDING

A. Apply seed at a rate of 10 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Do not sow immediately following rain, when ground is too dry, or during windy periods.

D. Roll seeded area with roller not exceeding 112 lbs.

E. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
   1. Where pelleted mulch is incorporated, apply at manufacturer's recommended rate of coverage.

F. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

G. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.5 HYDROSEEDING

A. Apply seeded slurry with a hydraulic seeder at a rate of 10 lbs per 1000 sq ft evenly in two intersecting directions.

B. Do not hydroseed area in excess of that which can be mulched on same day.

C. Immediately following seeding, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.

D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

E. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.6 PROTECTION

A. Cover seeded slopes where grade is 36 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

B. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

C. Secure outside edges and overlaps at 36 inch intervals with stakes.

D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.7 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water.

B. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.

C. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

D. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

E. Neatly trim edges and hand clip where necessary.

F. Immediately remove clippings after mowing and trimming.

G. Water to prevent grass and soil from drying out.

H. Roll surface to remove minor depressions or irregularities.

I. Control growth of weeds.

J. Immediately reseed areas that show bare spots.

K. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 32 93 00
PLANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparation of subsoil.

B. Topsoil bedding.

C. New trees, plants, and ground cover.

D. Mulch and Fertilizer.

E. Maintenance.

F. Tree Pruning.

1.2 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Topsoil material.

B. Section 31 23 23 - Fill: Topsoil material.

1.3 DEFINITIONS

A. Weeds: Any plant life not specified or scheduled.

B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.4 REFERENCE STANDARDS

A. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock; 2014.

B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2017.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Maintenance Data: Include cutting and trimming method; types, application frequency, and recommended coverage of fertilizer.

C. Submit list of plant life sources.

D. Maintenance Contract.

1.6 QUALITY ASSURANCE

A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.

B. Installer Qualifications: Company specializing in installing and planting the plants with 5 years experience.

C. Tree Pruner Qualifications: Company specializing in pruning trees with proof of Arborist Certification.

D. Maintenance Services: Performed by installer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

B. Protect and maintain plant life until planted.

C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.8 FIELD CONDITIONS

A. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

B. Do not install plant life when wind velocity exceeds 30 mph.

1.9 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide one year warranty.

C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.

D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

PART 2 PRODUCTS

2.1 PLANTS

A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.2 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.

2.3 SOIL AMENDMENT MATERIALS

A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis.

B. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.

C. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.

D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

E. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants.

2.4 MULCH MATERIALS

A. Mulching Material: Double Ground Hardwood, Dark Brown in color species wood shavings, free of growth or germination inhibiting ingredients.

2.5 ACCESSORIES

A. Wrapping Materials: Burlap.

B. Stakes: Softwood lumber, pointed end.

C. Cable, Wire, Eye Bolts and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

E. Landscape Fabric: Non-woven, needle punched, polypropylene, fabric; Mirafi MSCAPE, or approved equal.

2.6 PLANT SOIL MIX

A. A uniform mixture of 1 part peat and 3 parts topsoil by volume.

2.7 SOURCE QUALITY CONTROL

A. Provide analysis of topsoil; comply with requirements of Section 01 40 00.

B. Provide testing of imported topsoil.

C. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared subsoil and planters are ready to receive work.

B. Saturate soil with water to test drainage.

C. Verify that required underground utilities are available, in proper location, and ready for use.

3.2 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Scarify subsoil to a depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

D. Dig pits and beds 6 inches larger than plant root system.

3.3 PLACING TOPSOIL

A. Spread topsoil to a minimum depth of 4 inches over area to be planted. Rake smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches.

3.4 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

3.5 PLANTING

A. Place plants for best appearance for review and final orientation by Architect.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from the root ball.

E. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch layers. Maintain plant life in vertical position.

F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.6 PLANT RELOCATION AND RE-PLANTING

A. Relocate plants as indicated by Architect.

B. Replant plants in pits or beds, partly filled with prepared topsoil mixture, at a minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from the root ball.

C. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch layers. Maintain plant materials in vertical position.

D. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.7 INSTALLATION OF ACCESSORIES

A. Wrap deciduous shade and flowering tree trunks and place tree protectors.

3.8 PLANT SUPPORT

A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:
   1. Tree Caliper: 1 inch; Tree Support Method: 1 stake with one tie
   2. Tree Caliper: 1 to 2 inches; Tree Support Method: 2 stakes with two ties

3. Tree Caliper: 2 to 4 inches; Tree Support Method: 3 stakes with 2 ties

3.9 TREE PRUNING

A. Prune trees as recommended in ANSI A300 Part 1.

B. Prune newly planted trees as required to remove dead, broken, and split branches.

3.10 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.11 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water.

B. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

C. Provide a separate maintenance contract for specified maintenance service.

D. Maintain plant life immediately after placement and until plants are well established and exhibit a vigorous growing condition. Continue maintenance until termination of warranty period.

E. Irrigate sufficiently to saturate root system and prevent soil from drying out.

F. Remove dead or broken branches and treat pruned areas or other wounds.

G. Neatly trim plants where necessary.

H. Immediately remove clippings after trimming.

I. Control growth of weeds.

J. Control insect damage and disease.

K. Maintain wrappings, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

END OF SECTION

SECTION 33 01 10.58
DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Disinfection of site domestic water lines and site fire water lines specified in Section 33 14 16.

B. Testing and reporting results.

1.2 RELATED REQUIREMENTS

A. Section 33 14 16 - Water Utility Distribution Piping.

1.3 REFERENCE STANDARDS

A. AWWA B300 - Hypochlorites; 2018.

B. AWWA B301 - Liquid Chlorine; 2010.

C. AWWA B302 - Ammonium Sulfate; 2016.

D. AWWA B303 - Sodium Chlorite; 2018.

E. AWWA C651 - Disinfecting Water Mains; 2014.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: From authority having jurisdiction indicating approval of water system.

D. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

E. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

F. Bacteriological report:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water complies, or fails to comply, with bacterial standards of the Authorities Having Jurisdiction.

1.5 QUALITY ASSURANCE

A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.

B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of the State of New York.

C. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.1 NO HEAVILY CHLORINATED WATER SHALL BE DISCHARGED INTO ANY WATERWAY OR SEWER SYSTEM. A MINIMUM OF 150' OF OVERLAND FLOW SHALL BE REQUIRED BEFORE ENTERING THE ABOVE REFERENCED DISCHARGE LOCATIONS. IN ALL CASES, HEAVILY CHLORINATED WATER DISPOSAL SHALL BE IN ACCORDANCE WITH AWWA C651 - SECTION 6.2, AND APPENDIX B.

3.2 PRELIMINARY FLUSHING

A. The main shall be flushed prior to disinfection at a flushing velocity of not less than 3 ft/sec. The rate of flow required to produce this velocity in various diameters is shown below.

Required Opening to Flush Pipelines
(40-psi Residual Pressure)

Pipe size in.	Flow required to produce 3 fps velocity gpm
6	270
8	470
10	730
12	1100
14	1440

3.3 NO SITE FOR FLUSHING SHOULD BE CHOSEN UNLESS IT HAS BEEN DETERMINED THAT DRAINAGE IS ADEQUATE AT THAT SITE.

3.4 FORM OF CHLORINE FOR DISINFECTION

A. The most common forms of chlorine used in the disinfecting solutions are calcium hypochlorite granules or sodium hypochlorite solutions.

B. Calcium Hypochlorite: Calcium hypochlorite contains 70 percent available chlorine by weight. calcium hypochlorite is packaged in containers of various types and sizes ranging from small plastic bottles to 100-lb drums.
   1. A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

C. Sodium Hypochlorite: Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. It is packaged in liquid form in glass, rubber or plastic containers ranging in size from 1-qt. bottles to 5-gal. carboys. It may also be purchased in bulk for delivery by tank truck.
   1. The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.
   2. Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically-powered chemical feed pump designed for feeding chlorine solutions. For small applications the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

3.5 METHODS OF CHLORINE APPLICATION

A. Continuous Feed Method: This method is suitable for general application.

B. Chlorine Required to Produce 50 Mg/l Concentration in 100 ft. of Pipe by Diameter

Pipe size in.	100 percent chlorine - lb.	1 percent chlorine solutions - gal.
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
14	0.327	3.92

C. Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/L available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of Standard Methods and AWWA M12-Simplified Procedures for Water Examination.
   1. NOTE: In the absence of a meter, the rate may be determined either by placing a Pitot gage at the discharge or by measuring the time to fill a container of known volume.

D. The table in paragraph above gives the amount of chlorine residual required for each 100 ft. of pipe of various diameters. Solutions of 1 percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 lb. of calcium hypochlorite in 8.5 gal of water.

E. During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hr., during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24 hr. period, the treated water shall contain no less than 25 mg/L chlorine throughout the length of the main.

3.6 EXAMINATION

A. Verify that piping system and water well has been cleaned, inspected, and pressure tested.

B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.7 DISINFECTION - PIPING

A. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction, or in the absence of any of these follow AWWA C651.

B. Provide and attach equipment required to perform the work.

C. Inject treatment disinfectant into piping system.

D. Maintain disinfectant in system for 24 hours.

E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.

F. Replace permanent system devices removed for disinfection.

G. Pressure test system to 200 psi. Repair leaks and re-test.

3.8 FINAL FLUSHING

A. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/L. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline.

3.9 BACTERIOLOGIC TESTS

A. After final flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least two samples shall be collected from throughout the new main from unchlorinated supplies. Samples shall be collected at least 24 hours apart.
   1. NOTE: In the case of extremely long mains, it is desirable that samples be collected the length of the line as well as at its end.

B. Samples for bacteriologic analysis shall be collected in sterile bottles treated with sodium thiosulphate. No hose or fire hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard corporation cock installed in the main with a copper tube gooseneck assembly. After samples have been collected the gooseneck assembly may be removed, and retained for future use.

3.10 REPETITION OF PROCEDURE

A. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained.

3.11 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. Test samples in accordance with AWWA C651.

END OF SECTION

SECTION 33 05 61
CONCRETE MANHOLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Precast concrete manholes.

B. Grade adjustments.

C. Frames and covers.

D. Bedding and cover materials.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 20 00 - Unit Masonry: Masonry units and mortar and grout.

C. Section 31 23 16 - Excavation.

D. Section 31 23 23 - Fill.

E. Section 33 42 11 - Site Storm Utility Drainage Piping.

1.3 REFERENCE STANDARDS

A. AASHTO HB - Standard Specifications for Highway Bridges; 2002, with Errata (2005).

B. ACI 301 - Specifications for Structural Concrete; 2016.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

D. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

F. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

G. ASTM C55 - Standard Specification for Concrete Building Brick; 2017.

H. ASTM C139 - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes; 2017.

I. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.

J. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.

L. ASTM C478/C478M - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections; 2020.

M. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.

N. ASTM C923/C923M - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals; 2020.

O. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants; 2009 (Reapproved 2019).

P. ASTM C1634 - Standard Specification for Concrete Facing Brick; 2017.

Q. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manhole covers, component construction, features, configuration, and dimensions.

C. Shop Drawings: Indicate manhole locations, elevations, piping and opening sizes and elevations of penetrations.

D. Manufacturer's qualification statement.

E. Project Record Documents:
1. Record invert elevations of concrete manholes.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Perform work in accordance with Department of Transportation Standards in the State of New York.

1.6 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 CONCRETE MANHOLES

A. Weight Rating: H 10 according to AASHTO HB.

B. Precast Concrete Manholes: Comply with ASTM C478/C478M, reinforced.
1. Wall Thickness: 6 inches (152 mm).
2. Base Thickness: 12 inches (305 mm).
3. Reinforcement: Formed steel wire, galvanized finish, wire diameter as indicated on drawings.
4. Joint Sealant: Comply with ASTM C990.

C. Cast-In-Place Concrete Materials: See Section 03 30 00.

D. Grade Adjustments:
1. Concrete Bricks: ASTM C1634 or ASTM C55 Grade N, cored, normal weight.
2. Adjustment Ring: Expanded polypropylene, 6 inches (152 mm) wide, diameter matching frame dimensions, in accordance with ASTM C478/C478M.
a. Manufacturers:
1) EJ; INFRA-RISER Adjustment Riser: www.ejco.com/#sle.

2) Substitutions: See Section 01 60 00 - Product Requirements.

E. Mortar Mixing:
1. Thoroughly mix mortar ingredients in accordance with ASTM C270 and in quantities needed for immediate use.
2. Maintain sand uniformly damp immediately before the mixing process.
3. Do not use antifreeze compounds to lower the freezing point of mortar.

F. Frame and Cover: Cast iron construction, ASTM A48/A48M, Class 30B, machined flat bearing surface; hinged; sealing gasket.

2.2 COMPONENTS

A. Frame and Cover: ASTM A48/A48M, Class 30B cast iron construction, machined flat bearing surface; sealing gasket.

B. Cover: Removable, lockable; closed cover design; cover molded with identifying name.
1. Sanitary sewer manhole covers are to be water tight.

C. Proof Load: Medium duty, H-20 loading.
1. Manufacturers:
a. American Cast Iron: www.amercast.com.
b. Neenah Foundry: www.nfco.com.

D. Manhole, Catch Basin and Structure Steps: Formed aluminum or polypropylene plastic rungs; 3/4 inch diameter. Formed integral with manhole, catch basin and structure sections.

2.3 CONFIGURATION

A. Clear Inside Dimensions: As indicated on drawings.

B. Design Depth: As indicated on drawings.

C. Clear Lid Opening: As indicated on drawings.

D. Pipe Entry: Provide openings as indicated on drawings.

E. Steps: 16 inches wide, 12 inches on center vertically, set into manhole wall as indicated on drawings or required by code.

2.4 BEDDING AND BACKFILL MATERIALS

A. Bedding: Shall be a minimum six (6) inches of crushed stone or as indicated on drawings in accordance with Section 31 23 23.

B. Backfill above pipe to grade: Shall be select native fill in accordance with Section 31 23 23 or as indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify items provided by other sections of work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify excavation for manholes is correct.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

D. Excavation and Backfill:
1. Excavate for manholes and structures in accordance with Section 31 23 16 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes, dry well and structures in dry trench.
3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.

3.3 EXCAVATION AND FILL

A. Hand trim excavation for accurate placement to indicated elevations.

B. Backfill with cover fill, tamp in place and compact, then complete backfilling.

3.4 INSTALLATION

A. Establish elevations and pipe inverts for inlets and outlets as indicated in drawings.

B. Precast Concrete Manholes:
1. Place base section plumb and level.
2. Install joint sealant uniformly around section lip.

C. Grade Adjustments:
1. Lay brick or masonry units uniformly on mortar bed with full head joints, running bond. Top with mortar, plumb and level.
2. Install expanded polypropylene ring according to manufacturer's instructions.
3. Place adjacent materials tight, and smooth following design grades.

D. Frames and Covers:
1. Place frame plumb and level.
2. Mount frame on mortar bed at indicated elevation.
3. Mount frame on expanded polypropylene ring according to manufacturer's instructions.
4. Place grate in frame securely.

3.5 MANHOLES - MODULAR PRECAST CONCRETE

A. Lift precast components at lifting points designated by manufacturer.

B. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remains clean.

C. Set precast structures bearing firmly and fully on crushed stone bedding, compacted in accordance with provisions of Section 31 23 16, 31 23 23 or on other support system shown on Drawings.

D. Assemble multi-section structures by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections.

E. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.
   1. Joint sealing materials may be installed on site or at manufacturer's plant.

F. Verify manholes and structures installed satisfy required alignment and grade.

G. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.

H. Cut pipe to finish flush with interior of structure.

I. Shape inverts through manhole and structures as shown on Drawings.

3.6 FRAME AND COVER INSTALLATION

A. Set frames using mortar and masonry. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Where more than one course of concrete brick is required, stagger vertical joints.

B. Set frame and cover 2 inches above finished grade for manholes and structures with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

3.7 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test cast-in-place concrete in accordance with Section 03 30 00.

C. Vertical Adjustment of Existing Manholes and Structures:
   1. Where required, adjust top elevation of existing manholes and structures to finished grades shown on Drawings.
   2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.
   3. Remove concrete without damaging existing vertical reinforcing bars when removal of existing concrete wall is required. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated Drawings.

D. Vacuum Testing
   1. Vacuum testing in accordance with ASTM C1244 and as follows:
      a. Inflate compression band to effect seal between vacuum base and structure; connect vacuum pump to outlet port with valve open; draw vacuum to 10 inches of Hg; close valve; start test.
      b. Test:
         1) Determine test duration for manhole test from the following Table 1:

Table 1 Minimum Test Times for Various Manhole Diameters (30 - 120 in.) in Seconds									
Depth (ft)	Diameter, in.								
	30	33	36	42	48	54	60	66	72
	Times, in seconds								
<4	6	7	7	9	10	12	13	15	16
6	9	10	11	13	15	18	20	22	25
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

Table 1 Minimum Test Times for Various Manhole Diameters (30 - 120 in.) in Seconds								
Depth (ft)	Diameter, in.							
	78	84	90	96	102	108	114	120
	Times, in seconds							
<4	18	19	21	23	24	25	27	29
6	26	29	31	34	36	37	41	43
8	35	38	41	45	48	51	54	57
10	44	48	52	56	60	63	67	71
12	53	57	62	67	71	76	81	85
14	62	67	72	78	83	89	94	100
16	70	76	83	89	95	101	108	114
18	79	86	93	100	107	114	121	128
20	88	95	103	111	119	126	135	142
22	97	105	114	122	131	139	148	156
24	106	114	124	133	143	152	161	170
26	114	124	134	144	155	164	175	185
28	123	133	145	155	167	177	188	199
30	132	143	155	166	178	189	202	213

2) Record vacuum drop during test period; when vacuum drop is greater than 1 inch of Hg during test period, repair and retest manhole; when vacuum drop of I inch of Hg does not occur during test period, discontinue test and accept manhole.
3) When vacuum test fails to meet 1 inch Hg drop in specified time after repair, repair and retest manhole.

E. Exfiltration/Infiltration Testing (Alternative Method)

1. All sewers entering and leaving each manhole shall be plugged as for air testing. Those manholes which are constructed in a high ground water table location will be allowed to remain plugged for a period of not less than four (4) hours, after which the quantity of inward leakage accumulation will be measured by bailing and measuring and/or computation against depth of water and diameter of the manhole. Those manholes constructed above the ground water table will be filled with water to the top of the cast iron frame and allowed to stand until the walls are well soaked. The manhole shall then be refilled to the full or overflow point, and remain undisturbed for a period of not less than four (4) hours. The loss of water shall be measured by refilling to the top with a pre measured quantity of water and/or computation against depth of water loss and diameter of the manhole.
2. Allowable leakage (gain or loss) by the respective methods shall not exceed the following:
   0.04 gal. per hour, per vertical ft. of depth in barrel section
   0.03 gal. per hour, per vertical ft. of depth in cone section
   0.02 gal. per hour, per vertical ft. of depth in top section
3. Should any test of any manhole disclose leakage greater than that permitted, the CONTRACTOR shall, at his own expense and at no additional cost to the OWNER, locate and repair the defects joints and/or pipe until the leakage is within the permitted allowance utilizing materials and methods approved by the OWNER/ENGINEER.

END OF SECTION

SECTION 33 14 16
WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water pipe for site conveyance lines.

B. Pipe valves.

C. DR11 HDPE Pipe and Fittings.

D. Copper Tubing and Fittings.

E. Tracer Wire, Underground Warning tape.

1.2 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Section 33 01 10.58 - Disinfection of Water Utility Piping Systems: Disinfection of site service utility water piping.

1.3 REFERENCE STANDARDS

A. AASHTO HB - Standard Specifications for Highway Bridges; 2002, with Errata (2005).

B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.

C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.

D. ASME B18.2.2 - Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series); 2015.

E. ASME B18.5.2.1M - Metric Round Head Short Square Neck Bolts; 2006 (Reaffirmed 2011).

F. ASME B18.5.2.2M - Metric Round Head Square Neck Bolts; 1982 (Reaffirmed 2010).

G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).

H. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.

I. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.

J. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).

K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.

L. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).

M. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service; 2009.

N. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; 2015.

O. AWWA C606 - Grooved and Shouldered Joints; 2015.

P. AWWA C800 - Underground Service Line Valves and Fittings; 2014.

Q. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; 2017.

R. NSF 372 - Drinking Water System Components - Lead Content; 2016.

S. NSF 61 - Drinking Water System Components - Health Effects; 2019.

T. ASTM D3261 - 10a Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with utility company requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.1 SOURCE QUALITY CONTROL

A. All Products incorporated into the Work of this section shall be manufactured in the United States and shall be clearly indicated in all appropriate submittals unless specifically approved otherwise by the Engineer.

2.2 GENERAL

A. Potable Water Supply Systems: All materials contacting potable water shall be certified compliant with NSF 61 for maximum lead content; label pipe and fittings.

2.3 WATER PIPE

A. Copper Tubing: ASTM B88, Type K, Annealed:
   1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
   2. Joints: Compression connection or AWS A5.8M/A5.8, BCuP silver braze.

B. HDPE Pipe
   1. Materials used for the manufacturing of polyethylene pipe and fittings shall be high density polyethylene (HDPE). The HDPE materials also shall be certified as suitable for potable water products by the National Sanitation Foundation (NSF) and AWWA (AWWA standard is C906). The material shall have a minimum hydrostatic design basis (HDB) of 1600 psi at 73° F.
   2. Pipe shall be manufactured in accordance with AWWA C-906. Pipe shall be furnished with squarely cut, plain ends in lengths that will allow for easy unloading, storage and

installation. Nominal diameter, dimension ration, and pressure class shall be as shown on the contract drawings or herein specified.

3. Permanent identification of piping service shall be provided by co-extruding blue material into the pipe's outside surface. The material used shall be the same material as the pipe except for color. Stripes printed or painted on the outside surface shall not be acceptable.
4. Fittings shall conform to ASTM D3261 for butt-type and shall be molded or thermoformed from sections of pipe.
5. All pipe lengths and fittings shall be joined by thermal butt-fusion in accordance with the manufacturer requirements. Mechanical joint fittings and HDPE/MJ adapters with internal stiffening ring shall join all connections to existing watermains and new appurtenances (HD C110 full body MJ gland, stiffener and stainless steel tee bolts). Nominal diameter and dimension ratio shall be as shown on the contract drawings.
6. The pipe and fitting Manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination. The cell classification properties of the material shall be certified by the supplier. Incoming materials shall be approved by Quality Control before processing into finished goods. Outgoing products shall be tested as required in AWWA C906.
7. The Manufacturer shall maintain permanent Quality Control (QC) and Quality Assurance (AQ) records. Certification or copy of these records shall be made available to the Engineer on request.

C. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service" in large letters.

D. Curb Boxes:
1. Mueller style, improved extension type with arch pattern base.
2. Extension rod and cotter pin shall be stainless steel.

2.4 CURB STOP ASSEMBLY

A. Manufacturers:
1. Mueller Company, Decatur, Illinois, Model H-15209 for 3/4" to 2".

B. Curb Stops:
1. Bronze body with check valve.
2. Curb stops shall be designed for a working pressure of 175 psi.
3. If a weep is required it shall be noted on the drawings.

C. Curb Boxes and Covers:
1. Mueller Model H-10334 for 3/4" to 2".
2. Shall be extension type, arch pattern, cast iron, adjustable with the word water cast in the top and an arrow indicating the direction of opening.
3. Equipped with Stationary rod and ring guide.

2.5 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves Up To 3 Inches:
1. Manufacturers:
a. Ford
b. Substitutions: See Section 01 60 00 - Product Requirements.
2. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, post indicator, valve key, and extension box.

2.6 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 23 16.13.

B. Cover: As specified in Section 31 23 16.13.

2.7 UNDERGROUND WARNING TAPE

A. Plastic Ribbon Tape: Bright colored, continuously printed, minimum 6 inches (150 mm) wide by 4 mil (0.10 mm) thick, manufactured for direct burial service.

2.8 UNDERGROUND PIPE MARKER

A. Utility Witness marker shall be lightweight, flat-style marker installed using a manual driving tool. Marker shall be made from fiberglass reinforced composite material.

B. Marker color & size: Blue; 66" L x 3.75" W

2.9 UNDERGROUND TRACE WIRE

A. Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service " in large letters.

2.10 JOINT RESTRAINT APPURTENANCES

A. M/J Joint Thrust Restraint Glands shall meet consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of AWWA C110 and have a working pressure rating of 350 psi.

B. Push on Joint Thrust Restraint shall meet or exceed the performance criteria of U.S. Pipe Field Lok Gaskets, Gripper Gaskets, or Approved Equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.2 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

D. All PVC or Polyethylene Pipe shall not be left exposed to the sun and shall be covered. The contractor shall also provide documentation to the Construction Inspector as to the pipe’s age and handling prior to being delivered to the site. This is to prevent pipe that has been left exposed to the sun at a storage yard from being used on the project. Lack of documentation of PVC or HDPE history will cause said pipe to be rejected.

3.3 TRENCHING

A. See the sections on excavation and fill for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide thrust restraint bearing on subsoil.

D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.4 BEDDING

A. Excavate pipe trench in accordance with Section 31 26 16.13 for Work of this Section.

B. Place bedding material according to the trench details provided on the Engineering Drawings.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 95 percent.

D. Place fill material in accordance with Section 31 23 23.

3.5 INSTALLATION - PIPE

A. Maintain separation of water main from [] piping in accordance with applicable code.

B. HDPE Pipe:
1. The Manufacturer shall supply an Installation Manual to the Engineer which outlines guidelines for handling, joining, installing, embedding and testing of polyethylene pipeline. These guidelines shall be used as reference material for the Engineer in his determination of the required procedures.
2. Joints between plain ends of polyethylene pipe shall be made by butt fusion when possible. The Pipe Manufacturer's fusion procedures shall be followed at all times as well as the recommendations of the Fusion Machine Manufacturer. The wall thickness of the adjoining pipes shall have the same DR at the point of fusion.
3. If mechanical fittings (which are designed for, or tested and found acceptable for use with polyethylene pipe) are utilized for transitions between pipe materials, repairs, jointing pipe sections, saddle connections, or at other locations; the recommendation of the Mechanical Fitting Manufacturer must be followed. These procedures may differ from other pipe materials.
4. Where connecting to newly laid ductile iron pipe, the next two ductile iron pipe joints adjacent to the HDPE/DIP connection shall utilize boltless restraining gaskets as approved by the engineer.
5. On each day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion test straps shall be cut out. The test strap shall be 12" or 30 times the wall thickness in length (minimum) and 1" or 1.5 times the wall thickness in width (minimum). Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
6. Pressure testing shall be conducted in accordance with the Manufacturer's recommended procedure. Pressure testing shall use water as the test media. Pneumatic (air) testing is prohibited.
7. Consideration should be given by the Contractor that the length of the HDPE piping expands and contracts considerably with changes in temperature. As such, the Contractor should take appropriate measures to ensure that undue stresses do not occur with fused pipe and its associated fittings.
8. The manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications and as shown on the contract drawings.

9. Caution shall be exercised at all times to avoid compression, damage or deformation to the pipe. Pipe shall be inspected before installation for cracks, defects, and chips and any pipe or fittings containing harmful imperfections shall be rejected and removed from the job site. HDPE pipe shall be supported by racks during storage to prevent damage to the bottom. Pipe stored outside shall be covered with opaque material while permitting air circulation around the pipe to prevent excessive heat accumulation. The interior as well as all sealing surfaces or pipe, fittings and other accessories shall be kept free from dirt and foreign matter. Severe impact blows, abrasion damage, and gouging or cutting by metal surfaces or rocks shall be avoided.

C. Copper Tubing
1. Earthwork shall be as described in Section 31 23 23 – Trenching except as amended herein. Unless otherwise detailed on the drawings, no bedding shall be required and backfill up to one foot above the tubing may be select native material. Stones larger than 2 inches shall not be placed in direct contact with the copper tubing. Horizontal goosenecks shall be used at the main connection. Minimum cover shall be 5 ft. unless ordered otherwise by the Engineer.
2. Service tubing to be installed under roadway (not including driveways) pavement, or at other locations shown on the drawings, shall be done without cutting or disturbing the pavement Installation of copper tubing beneath local roadways can be installed using jacking, missile or directional drilling methods.

3.6 INSTALLATION - CURB STOP ASSEMBLY

A. Set curb stops on solid bearing surface.

B. Center and plumb curb box over curb stops. Set box cover flush with finished grade.

C. Any curb boxes that contain a weep shall have at least 18 inches of washed crushed stone placed beneath the assembly for drainage.

3.7 INSTALLATION - VALVES AND HYDRANTS

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

3.8 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. Pressure test water piping to 200 pounds per square inch.
1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct, in presence of Architect/Engineer, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600.
2. Provide equipment required to perform leakage and hydrostatic pressure tests.
3. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
4. Conduct hydrostatic test for at least two-hour duration.
5. No pipeline installation will be approved when pressure varies by more than 5 psi at completion of hydrostatic pressure test.
6. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks removed and plug resulting piping openings.
7. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.

8. Examine exposed piping, fittings, valves, hydrants, and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.
9. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

   $L = (S*D*\sqrt{P})/133,200$
   L = allowable, in gallons per hour
   S = length of pipe tested, in inches
   D = nominal diameter of pipe, in inches
   p = average test pressure during leakage test, in pounds per square inch (gauge)

10. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

SECTION 33 42 11
SITE STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stormwater drainage piping.

B. Stormwater pipe accessories.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.

B. Section 31 23 16 - Excavation: Excavating of trenches.

C. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

D. Section 31 23 23 - Fill: Bedding and backfilling.

E. Section 33 05 61 - Concrete Manholes.

1.3 REFERENCE STANDARDS

A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).

B. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2018.

C. ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping; 2001 (Reapproved 2014).

D. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2017.

E. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Material; 2014.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

E. Project Record Documents:
   1. Record location of pipe runs, connections, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.1 STORMWATER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Plastic Pipe: ASTM D2729, Poly Vinyl Chloride (PVC) material; inside nominal diameter of 4-15 inches, bell and spigot style solvent sealed joint end.

C. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) corrugated wall pipe with integrally formed smooth liner; inside nominal diameter of 3 - 60 inch, meeting the requirements of AASHTO M 252, Type S, for diameters between 3 inches and 10 inches and AASHTO M 294, Type S, for diameters between 12 inches and 60 inches, soil-tight, bell and spigot joints with rubber gaskets, with pipe and fittings manufactured from virgin PE compounds with cell classification 3254420C, or better.

2.2 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Filter Fabric: Non-biodegradable, woven.

C. Trace Wire: Magnetic detectable conductor, clear plastic covering, minimum 6 inches wide by 4 mil thick, imprinted with "Storm Sewer Service " in large letters, for direct burial service.

2.3 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 23 16.13.

B. Cover: As specified in Section 31 23 16.13.

PART 3 EXECUTION

3.1 TRENCHING

A. See Section 31 23 16.13 - Trenching for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling to provide top cover to minimum compacted thickness of 12 inches exclusive of asphalt or concrete, compacted to 95%.

3.2 INSTALLATION

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Connect to building storm drainage system, foundation drainage system, and utility/municipal system.

E. Make connections through walls through sleeved openings, where provided.

F. Install continuous trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.3 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01 40 00 - Quality Requirements.

3.4 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

B. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION

SECTION 33 44 19
STORMWATER TREATMENT UNIT

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope
   1. The Contractor shall furnish all labor, equipment and materials necessary to install the stormwater treatment unit (STU) and appurtenances specified in the Drawings and these specifications.

1.2 RELATED REQUIREMENTS

A. Section 31 23 16 - Excavation and Fill

B. Section 33 05 61 - Concrete Manholes

C. Requirements
   1. Treat 0.84 or 1.5 cfs of stormwater runoff for 80% total suspended solid removal, depending on what unit is specified.

1.3 QUALITY ASSURANCES

A. Inspection
   1. All components shall be subject to inspection by the Engineer at the place of manufacture and/or installation. All components are subject to be rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair. Final acceptance of the component is contingent upon the discretion of the Engineer.

B. Warranty
   1. The manufacturer shall guarantee the STU components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall be notified of repair/replacement issues in writing within the referenced warranty period. The manufacturer shall, upon its determination of repair, correct or replace any manufacturer originated defects identified by written notice within the referenced warranty period. The use of STU components shall be limited to the application for which it was specifically designed.

C. Manufacturer’s Performance Certificate
   1. The STU manufacturer shall submit to the Engineer of Record a “Manufacturer’s Performance Certification” certifying that each STU is capable of achieving the specified removal efficiencies as listed in these specifications. The certification shall be supported by independent third-party research.

1.4 SUBMITTALS

A. Shop Drawings
   1. The contractor shall prepare and submit shop drawings for the Engineer approval. The shop drawings shall detail horizontal and vertical dimensioning, reinforcement and joint type and locations.

B. Calculations

1. The contractor shall submit certified testing data confirming the manufacturer stated removal efficiencies.
2. The contractor shall prepare and submit project specific hydraulic calculations showing the treatment capacity of the proposed unit and its ability to accommodate the specified peak conveyance capacity.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN

A. STU unit shall be:First Defense - HC manufactured by Hydro International.

B. Or Approved Equal.

C. Substitutions: See Section 01 60 00 - Product Requirements, for substitution procedures.

2.2 MATERIALS AND DESIGN

A. Precast Concrete Components - Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:
   1. Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
   2. Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
   3. Cement shall be Type III Portland Cement conforming to ASTM C 150;
   4. Aggregates shall conform to ASTM C 33;
   5. Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185 or A 497, respectively;
   6. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990 and
   7. Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.

B. Internal Components and Appurtenances - Internal Components and appurtenances shall conform to the following:
   1. Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
   2. Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
   3. Fiberglass components shall conform to the National Bureau of Standards PS-15 and coated with an isophalic polyester gelcoat and
   4. Access system(s) conform to the following:
      a. Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.
      b. Hatch systems shall be designed to withstand AASHTO H-20 loadings. Hatch systems not subject to direct traffic shall be manufactured of Grade 5086 aluminum. Hatch systems subject to direct traffic loads shall be manufactured of steel conforming to ASTM A 36-93a, supplied with a hot-dip galvanized finish conforming to ASTM A 123 and access doors bolted to the frame.

2.3 PERFORMANCE

A. Removal Efficiencies
   1. The STU shall be capable of achieving an 80 percent average annual reduction in the total suspended solid load.

2. The STU shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 2.4 millimeters (mm) regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The STU shall be designed to retain all previously captured pollutants addressed by this subsection under all flow conditions.

B. Hydraulic Capacity
1. Unit values specified below represent 3' dia., 4' dia., and 5' dia. units respectively. See construction drawings for specified unit.
2. The STU shall provide treatment for the water quality flow rate of 0.84 or 1.5 cfs, depending on unit specified.
a. The STU shall provide a rated-treatment capacity of 19.2 or 34.4 gpm/square feet. Depending on unit specified.
b. The STU shall maintain the peak conveyance capacity of the drainage network of 15 or 18 cfs, depending on unit specified.

2.4 MANUFACTURER

A. The manufacturer of the STU shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the STU(s) shall be manufactured by an American or Canadian based company.

PART 3 EXECUTION

3.1 HANDLING AND STORAGE

A. The contractor shall exercise care in the storage and handling of the STU components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor.

3.2 INSTALLATION

A. The STU shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.

B. The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner which leaves no sharp points or edges.

END OF SECTION

SECTION 33 48 00
SUBSURFACE RETENTION SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stormwater Retention Chambers

B. Geotextile Fabric

1.2 RELATED REQUIREMENTS

A. Section 31 23 16 - Excavation: Excavating of trenches.

B. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

C. Section 31 23 23 - Fill: Bedding and backfilling.

D. Section 33 05 61 - Concrete Manholes.

1.3 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.4 REFERENCE STANDARDS

A. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2018.

B. ASTM F2648 - Standard Specification for High Density Polyethylene (HDPE) Sewer Pipe and fittings having smooth interior

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe and pipe accessories.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Design Calculations: Demonstrate that proposed products meet the required sizing and structural loading requirements, including a load resistance factor design and creep analysis. Calculations to confirm structural adequacy shall be provided to the engineer's satisfaction.

E. Shop Drawings: Contractor shall submit detailed drawings, showing proposed system layout, dimensions, elevations, cross section and materials.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. ADS Advanced Drainage Systems, Stormtech; www.ads-pipe.com.

B. Lane Enterprises, Stormkeeper: www.lane-enterprises.com.

2.2 MATERIALS

A. Materials shall be suitable to support the required loading conditions and to maintain longevity with frequent contact with stormwater flows.

B. Storm Chambers or Pipes: Series of chambers or pipes consisting of corrugated high density polyethylene, polyproplylene, or similar material placed within a stone bed.

C. Bedding Stone: 3/4" to 2" clean washed crushed angular stone.

D. Non-Woven Geotextile: AASHTO M288 Class 2 Non-Woven Geotextile Fabric such as a Mirafi 160N or approved equal. Non-Woven Geotextile is to be used as a seperation layer between the bedding stone and fill to prevent fines intrusion and as a filter layer over the sediment separator chamber or pipe to prevent fines from migrating out of the chamber during flow events.

E. Woven Geotextile: AASHTO M288 Class 1 Woven Geotextile Fabric such as a Mirafi 600X or approved equal. Woven Geotextile is to be used as a stabilization layer below the sediment separator chamber or pipe to prevent scouring of stone during cleaning and at each inlet row to prevent scouring during storm events.

2.3 PERFORMANCE

A. Capacity: System shall provide the minimum volume as stated on the contract documents.

B. Footprint: System shall provide the minimum footprint as stated on the contract documents.

C. Structural Loading Capacity: System shall be suitable for surface loading conditions and soil bearing above system, including creep.

D. Sediment separator: System shall provide a means of trapping sediment in water quality flow situations and allow for maintenance of this row to ensure longevity of the system.

E. High Flow Conditions: System shall be provided with a header system to allow for high flow situations to be distributed across the infiltration area.

F. Bedding: System shall be provided with a minimum of six (6) inches of stone bedding material above and below the storage devices. This is to be included in the maximum system depth as shown in the contract documents. Stone bedding material shall be provided between the chambers or pipes in accordance with the manufacturers recommendations but not less than six (6) inches.

2.4 QUALITY ASSURANCE

A. The manufacturer of the subsurface stormwater retention system shall be one that is regularly engaged in the engineering design and production of stormwater systems deployed for the management of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer.

B. Training

1. The Contractor and Manufacturer shall provide on-site training for the Owner's Facility Personnel.
2. The training shall include information and hands-on instructution regarding the installation, operation, and maintenance of the system and its components.

PART 3 EXECUTION

3.1 HANDLING AND STORAGE

A. The contractor shall exercise care in the storage and handling of the retention system components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor.

3.2 INSTALLATION

A. The subsurface system shall be installed in accordance with the manufacturer’s recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.

END OF SECTION