**ADDENDUM No. 02**
Date: 10/18/2024

# DORMITORY AUTHORITY - STATE OF NEW YORK

## 249 Glenwood Road

## Office for People with Developmental Disabilities

## Broome DDSO

## Parking Lot Expansion Project (3543609999)

## CR40 General Construction

This **ADDENDUM** is hereby included in and made part of the Contract whether or not attached thereto. All requirements of the original Specifications and Drawings shall remain in force except as noted by this **ADDENDUM No. 02**

**THE PURPOSE OF THIS ADDENDUM IS TO CHANGE THE FOLLOWING ITEMS:**

**Item No. 1** – Amending the date of the Project Bid Opening from Thursday, October 24, 2024 at 2:00 PM to Thursday October 31, 2024 at 2:00 PM. The date of the Pre-Award Meeting will also be revised.

In the Project Manual, Division 00 – Notice To Bidders, make the following revision:

a. DELETE the following: "Only those bids in the hands of DASNY, available to be read at 2:00 PM local time on October 24, 2024 will be considered."

b. INSERT the following: "Only those bids in the hands of DASNY, available to be read at 2:00 PM local time on October 31, 2024 will be considered."

In the Project Manual, Division 00 – Information For Bidders, make the following revision:

c. DELTE the following: "A mandatory pre-award meeting for the apparent low bidder will be held on Thursday, November 7th, 2024 at 11:00 AM."

d. INSERT the following: "A mandatory pre-award meeting for the apparent low bidder will be held on Thursday, November 14, 2024 at 11:00 AM."

**Item No. 2** – Attached at the end of this Addendum are the minutes and the sign-in sheet from the pre-bid meeting that was held on October 10, 2024.

**Item No. 3** – The following bidder questions are addressed as part of this Addendum:

**Question 1:** Drawing CD-101- Please clarify limits of clearing and grubbing. The limits on the drawing do not appear to be enough area to facilitate cut & fill per grading plans.

***Response 1:*** *Dwg CD-101 will be revised and re-issued via Addendum to provide this clarification.*

**Question 2:** Drawing C-301 - South side work limit shows grading adjustment outside of proposed asphalt replacement. Do we follow the grading plan or site layout plan?

***Response 2:*** *Dwg C-301 will be revised and re-issued via Addendum.*

**Question 3:** Drawing C-304 - Same as above, south of southmost curb island, proposed grades outside of proposed asphalt replacement.

***Response 3:*** *Response: Dwg C-304 will be revised and re-issued via Addendum.*

**Question 4:** Drawing CD-105 - Pipe removal outside of proposed asphalt pavement replacement. Will this work be blacktop replacement in-kind or pipe abandoned in-place?

***Response 4:*** *Response: Dwg CD-104 and Dwg CD-105 will be re-issued via Addendum to clarify that this 18" storm pipe is to be plugged with flowable fill and abandoned in place.*

**Question 5:** Sign Replacements - Most of the existing signage is scheduled to be salvaged for reinstallation. Please confirm no new signs and posts required.

***Response 5:*** *Although some of the existing signage is called for removal and reset on the Demolition Plans, there is a significant amount of new signs and posts that are specified on the Striping Plans (Drawing CS-101 to CS-104). The new sign and post installation details, as well as the table of new signage is provided on Detail E1 / Drawing C-502.*

**Question 6:** Can you please provide the pre-bid meeting minutes?

***Response 6:*** *The Pre-Bid Meeting minutes and sign-in sheet will be issued via Addendum.*

**Question 7:** Can any excess soils from the sitework be used/disposed of on campus property or will it need to be removed and disposed offsite?

***Response 7:*** *Although the Project has utilized areas adjacent to the work site for placement of excess soil as embankment, there will be a surplus of soil material that will need to be removed from the site. Part 3.19.A of Specification Section 312000 will be revised via Addendum to state that all surplus satisfactory and unsatisfactory soil is to be disposed off-site from the Owner's Property.*

**Question 8:** Is there any way you can add an asphalt escalation clause in this contract? For this amount of asphalt the price difference between now and next year could be significant.

***Response 8:*** *The Project Documents will not include an allowance for asphalt escalation.*

**Question 9:** Drawing C-302 doesn't have accurate existing grade lines due to the new parking lot that was installed. Can we get that revised for takeoff purposes?

***Response 9:*** *Dwg C-302 will be revised and re-issued via Addendum.*

**Question 10:** Would it be possible to push the bid date out a week or 2? This is a lot to work on and we have another project about this size bidding the day before this one.

***Response 10:*** *Addendum No. 2 will revise the bid opening date from October 24, 2024 to October 31, 2024.*

**Question 11:** Drawing C-304 proposed grade lines don't meet up with existing in some areas along the steep part. Can we get clarification on this?

***Response 11:*** *Dwg C-304 will be revised and re-issued via Addendum.*

**Question 12:** Drainage structure table on sheet C-508 doesn't match the utility plans. Which one is correct?

***Response 12:*** *The Drainage Structure Table on Detail B1 / Dwg C-508 will be revised and re-issued via Addendum.*

**Question 13:** Where exactly do the underdrains go? I saw them in the detail and a table with stations showing where they're supposed to go but that is a bit confusing to figure out. Can we get them on the utility plan for ease of construction and bidding?

***Response 13:*** *The Underdrain Table on Detail G5 / Dwg C-509 provides the location of underdrain where it will be placed along the curbline of the Perimeter Road. Note 2 on G5/C-509 provides information where additional underdrain is to be installed.*

**Question 14:** There seems to be asbestos in some curb caulk and sewer pipe joints or something. Do we need to have that abated or has that been done?

***Response 14:*** *The Hazardous Material Investigation Reports in the Project Manual indicate that although samples of caulk sealant and other suspect materials were sampled and tested, none of the materials tested were found to have asbestos, lead, or PCB's within the regulatory concentrations.*

**Question 15:** Temporary fence detail states that the temporary fence must be post driven. Can we substitute that with temporary fence bases?

***Response 15:*** *Regarding Temporary Construction Fence Detail B5 on Drawing C-508: Note # 3 of this Details states that the driven posts can be substituted for fence plates/bases in areas where underground utilities are present, or where it has been confirmed with the Owner's Representative to utilize base plates instead of posts at impervious pavement areas.*

**Question 16:** In the spec for sewer bypass pumping they want experience with sewer bypass projects. We have done culvert projects and bypass pumping for those. Will that be sufficient?

***Response 16:*** *Regarding Specification Section 330132 (Bypass Pumping): Part 1.6 of this Specification requests the Contractor to provide references of past projects where they have performed bypass pumping of similar complexity.*

**Question 17:** Drawing C-102 looks like it has a section of granite curb along the sidewalk. I don't see it named as such?

***Response 17:*** *Dwg C-102 will be revised and re-issued via Addendum to provide this clarification.*

**Question 18:** Drawing C-104 appears to have concrete in the east side islands but not in the other ones. I'm assuming the rest of the are lawn areas?

***Response 18:*** *Parking Lot Island areas that are not specifically delineated for concrete treatment are to be restored as lawn area (refer to Note # 1 on Dwg C-104).*

**Question 19:** Drawing C-205 has a shaded area and an area with slash marks (maybe a dry swale?) on the West and south side of the new parking lot. Is that just lawn area or something different?

***Response 19:*** *The East area noted at the East end of the reconstructed Parking Lot is to have a dry swale, and bioretention basin. Dwg CE-105 will be revised and re-issued via Addendum to confirm that this area is to receive a bioretention basin and dry swale, as per Details G1 and G5 on Drawing C-503.*

**Item No. 4** – The following revisions are made to the Project Manual as part of this Addendum:

4.1 Specification Section 033000 – Cast In Place Concrete:
a. REPLACE Section 033000 with the attached revised Section 033000.

4.2 Specification Section 312000 - Earth moving:

a. REPLACE Section 312000 with the attached revised Section 312000.

**Item No. 5** – The following revisions are made to the Contract Drawings as part of this Addendum:

5.1. Drawing CD-101 Demolition Plan:
a. REPLACE Drawing CD-101 with the attached revised Drawing CD-101.

5.2 Drawing CD-102 Demolition Plan:
a. REPLACE Note # 14 on Drawing CD-102 as follows: " 14. REGARDING THE TREES THAT ARE DESIGNATED FOR REMOVAL ON THE DEMOLITION PLAN: IN ORDER TO ELIMINATE ANY POTENTIAL BAT HABITAT, TREES THAT ARE LOCATED IN THE CLEARING AREA SHOWN ARE TO BE CUT DOWN AFTER NOVEMBER 1 AND PRIOR TO MARCH 31. IF ANY DESIGNATED TREES FOR REMOVAL ARE CUT DOWN BY THE OWNER, IT WILL BE THE CONTRACTORS RESPONSIBILITY TO REMOVE AND DISPOSE OF ANY REMAINING TREE LOGS AND STUMPS."

5.3 Drawing CD-103 Demolition Plan:
a. REPLACE Note # 14 on Drawing CD-103 as follows: " 14. REGARDING THE TREES THAT ARE DESIGNATED FOR REMOVAL ON THE DEMOLITION PLAN: IN ORDER TO ELIMINATE ANY POTENTIAL BAT HABITAT, TREES THAT ARE LOCATED IN THE CLEARING AREA SHOWN ARE TO BE CUT DOWN AFTER NOVEMBER 1 AND PRIOR TO MARCH 31. IF ANY DESIGNATED TREES FOR REMOVAL ARE CUT DOWN BY THE OWNER, IT WILL BE THE CONTRACTORS RESPONSIBILITY TO REMOVE AND DISPOSE OF ANY REMAINING TREE LOGS AND STUMPS."

5.4 Drawing CD-104 Demolition Plan:
a. REPLACE Drawing CD-104 with the attached revised Drawing CD-104.

5.5 Drawing CD-105 Demolition Plan:
a. REPLACE Drawing CD-105 with the attached revised Drawing CD-105.

5.6 Drawing C-102 Site Plan:
a. REPLACE Drawing C-102 with the attached revised Drawing C-102.

5.7 Drawing C-103 Site Plan:
a. At locations where granite curb is specified, REPLACE with concrete curb per Detail C3/C-502.

5.8 Drawing C-104 Site Plan:
a. At locations where granite curb is specified, REPLACE with concrete curb per Detail C3/C-502.

5.9 Drawing C-105 Site Plan:
a. At locations where granite curb is specified, REPLACE with concrete curb per Detail C3/C-502.

5.10 Drawing C-201 Utility Plan:
a. REPLACE Drawing C-201 with the attached revised Drawing C-201.

5.11 Drawing CE-105 Erosion and Sediment Control Plan:
a. REPLACE Drawing CE-105 with the attached revised Drawing CE-105.

5.12 Drawing C-301 Grading Plan:
a. REPLACE Drawing C-301 with the attached revised Drawing C-301.

5.13 Drawing C-302 Grading Plan:
a. REPLACE Drawing C-302 with the attached revised Drawing C-302.

5.14 Drawing C-304 Grading Plan:
a. REPLACE Drawing C-304 with the attached revised Drawing C-304.

5.15 Drawing C-305 Grading Plan:
a. REPLACE Drawing C-305 with the attached revised Drawing C-305.

5.16 Drawing C-502 Details:
a. REPLACE Drawing C-502 with the attached revised Drawing C-502.

5.17 Drawing C-507 Typical Section:
a. REPLACE Drawing C-507 with the attached revised Drawing C-507.

5.18 Drawing C-508 Details:
b. REPLACE Drawing C-508 with the attached revised Drawing C-508.

**END OF ADDENDUM**

Pre-Bid Meeting Minutes

# Broome Developmental Center, Building 3: Parking Lot Expansion Project 3543609999 / CR40 - General Construction

**Meeting Began at 11:00am on October 10th 2024 in the BRDDSO Theater Conference Room**

**Agenda covered:**

1. Introductions – Sign-In Sheet

2. Bid Opening – see Notice to Bidders

3. Information for Bidders (IFB) Section 17 – Forms and Documents for Bidding Requirements.

4. IFB Section 8.0 – Opportunity Programs Requirements.

5. IFB Section 17 – Forms and Documents for Contract form for Construction.

6. IFB Section 16 – Substantial Completion and Liquidated Damages.

7. Section 011200 Contract Summary of Work.

    a. It was clarified for all present that there is additional electrical scope inside the building footprint that would not be covered under this bid.

8. Open Discussion

    a. All present were reminded of the October 24th at 2:00pm deadline for bids
    b. All present were reminded that the deadline for RFI's was EOB on Monday October 14th.
    c. Contractor inquired if the curbs would be granite or concrete. Contractor was encouraged to submit a formal RFI so the response could be documented via Addendum. All contractors were encouraged to document any similar questions via RFIs.

9. Site Walkthrough
    a. Walkthrough concluded shortly after 12:00pm.

| Name | Company | Title | Phone # | Email |
|---|---|---|---|---|
| Kevin Perazzelli | DASNY | Project Manager | 518-801-3394 | kperazze@dasny.org |
| Ben Hathaway | Fahs | Site General Sup | 607-345-3789 | bhathaway@fahsconstruction.com |
| Tom Schuhle | Fahs | Foreman | 6073435127 | Tschuhle@fahsconstruction.com |
| Eric Hamm | Siteworx | Project Manager | 6073430244 | Eric@swxinc.com |
| Leroy Byler | Byler Exc | President | 607-760-0254 | leroy@byler-excavating.com |
| Tim Byler | Byler Exc. | Estimator | 607-222-3596 | tim@bylerexcavating.com |
| Jason O'Brien | Bothar Const. | Project Manager | 607 725 5012 | Jasonobrien@bothar-const.com |
| Mike Fernald | Broome Bit. | Project Mgr. | 607-729-0498 | MFernald@broomebit.com |
| John Wiedmer | Lancaster | Office Mgr | 607-727-6122 | JWiedmer@lancdev.com |
| Tim Hungerford | Upstate | VP | 607 281 5731 | Timh@upstatecompany.com |
| Larry Donahue | EES | Chief Estimator | 607 761-4470 | LDonahue@EESenergyservices.com |
| Dana Sloan | EES | PM | 607 727-0833 | dsloan@eesenergyservices.com |
| Kyle Brame | ZMK | PM | 607 6870981 | KBrame@ZMKconst.com |
| Teman Purdy | OPWH | Plant Sup | 607-222-7085 | teman.P.Purdy@opwh.ny.gov |
| Phil Mauro | DASNY | Field Rep | 518-704-7148 | Pmauro@dasn.org |
| Jeff Doll | DASNY | Cost Control | 518-321-6148 | jdoll@DASNY.ORG |

| Name | Company | Title | Phone # | Email |
|---|---|---|---|---|
| Dwight Wethey | C&S Engineers | Engineer | 315-703-4419 | dwethey@cscos.com |
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SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, and placement procedures for the following types of concrete mixes:

1. Foundations (Bases at Fences, Light Poles, Bollards).
2. Duct Banks.
3. **Cast In Place Concrete Curb**
4. Concrete for Walkways (refer to Specification Section 321313).

B. Related Sections:

1. Division 31 Section “Aggregates for Earthwork” for aggregate subbase course.
2. Division 31 Section “Earth Moving” for subgrade preparation.
3. Division 32 Section “Concrete Sidewalks”.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture.

a. Submit all mix design requirements in one package including product information for admixtures.
b. Indicate where each mix will be used
c. Indicate proposed method of curing
d. Provide an Environmental Product Declaration for each concrete mix

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Engineer.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.

2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

1.4 QUALITY ASSURANCE

A. Obtain cementitious materials from same source throughout project.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products, that complies with ASTM C 94/C 94M requirements for production facilities and equipment, and has a minimum three years experience.

1. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation (NYSDOT).
2. Truck mixers for concrete shall be currently approved by the New York State Department of Transportation (NYSDOT).
4. Fly Ash supplier shall be on the New York State Department of Transportation's current "Approved List of Suppliers of Fly Ash".
5. Source Quality Control: The Owner's Representative reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency.
6. Notify the Owner's Representative and the testing agency at least 24 hours prior to placing any concrete.

C. Installer Qualifications: Company specializing in performing work of this section with minimum three years documented experience.

D. Perform work in accordance with:

1. New York State Department of Transportation (NYSDOT) Standard Specifications (current version):
   a. Section 501: Portland Cement Concrete – General.
   b. Section 608: Sidewalks, Driveways, and Bicycle Paths.

2. ACI Publications:
   a. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
   b. ACI 301, "Specification for Structural Concrete."
   c. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

3. ASTM International:

a. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
b. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
c. ASTM C150 - Standard Specification for Portland Cement.
d. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
e. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
f. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
g. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
h. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

E. Preinstallation Conference: Conduct conference at Project site.

## PART 2 - PRODUCTS

### 2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum

D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.

F. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface

### 2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars, ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports

## 2.3 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer

B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. ASTM C 150, Type I or II Portland Cement.
2. Use approved brand without change for the entire project.
3. Cement used throughout the project shall be uniform in color so as not to prejudice the appearance of exposed concrete.

    a. Fly Ash: ASTM C 618, Class F, as per NYSDOT Standard Specifications Section 711-10 (Fly Ash).

C. Normal-Weight Aggregates: As per NYSDOT Standard Specifications Section 703-01 (Fine Aggregates) and 703-02 (Course Aggregate). Provide Aggregates from an approved NYSDOT source.

1. Fine Aggregate:
    a. Free of materials with deleterious reactivity to alkali in cement.
    b. Clean, sharp, natural sand free from loam, clay, organic impurities or foreign materials meeting the requirements of ASTM C33.
2. Coarse Aggregate: Crushed gravel or crushed stone meeting the requirements of ASTM C33. Aggregate size is dependent on mix type.

D. Water: As per NYSDOT Standard Specifications Section 712-01 (Water) and ASTM C 94/C 94M, Potable. Approval of Owner's Representative is required for any water source other than a public potable water supply.

E. Air-Entraining Admixture: As per NYSDOT Standard Specifications Section 711-08 (Admixtures) and ASTM C 260.

F. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. All admixtures to be used shall be submitted to the Owner’s

Representative for review. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

## 2.4 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Anti-Spalling, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B. Approved products and Manufactures include, but are not limited to, the following:

1. Kure-N-Seal by Sonneborn, A Division of BASF.
2. SealCure Emulsion by Conspec, A Dayton Superior Company.
3. Cure & Seal by Symons Corp.
4. Or Approved Equal.

## 2.5 RELATED MATERIALS

A. Expansion Joint Strips: As per NYSDOT Standard Specifications Section 705-07 (Premoulded Resilient Joint Filler) and ASTM D 1751, asphalt-saturated cellulosic fiber.

1. Use a material/manufacturer from the NYSDOT Approved List.

## 2.6 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume may be used to reduce the total amount of portland cement.

C. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight and lightweight concrete up to a maximum of 15 percent by weight of the required minimum

(Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.

D. All concrete shall be air-entrained.

E. Cast-in-place concrete shall be normal weight concrete and shall have a minimum compressive strength of 4000 psi except as otherwise specified on the drawing notes (5,000 psi for exterior walks and slabs). See table for location and concrete specifications.

| Location | F'c (Min. 28-Day Comp. Strength) (psi) | Cement Unit Weight (lbs/cy) min. | ASTM C33 Aggregate (Size No.) | Range * Slump (Inches) | Water Cement Ratio (by Weight) | Air Entr. (percent) ** |
|---|---|---|---|---|---|---|
| General Foundation (in-cludes founda-tions for Bollards, Handrail & Fence Posts & Light Poles, watermain thrust blocks | 4,000 | 611 | 67 or 57 | 2”- 4” | 0.46 | 4-8 |
| Duct Bank | 4,000 | 611 | 67 or 57 | 2”- 4” | 0.46 | 4-8 |
| Exterior Walk-ways and slabs | 5,000 | 573 | 67 or 57 | 2”- 4” | 0.46 | 4-8 |
| **Cast-In-Place Concrete Curb** | **5,000** | **680** | **67 or 57** | **1.5”-3.5”** | **0.44** | **4-8** |

*Slump, as noted in table, is before the addition of any water-reducing admixtures. When a water-reducing admixture is used, maximum slump shall be 6 inches.

**Use air-entraining admixture, not air-entrained cement.

F. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Owner's Representative. Use admixtures according to manufacturer's written instructions.

G. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the Owner, and as accepted by the Owner's Representative. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Owner's Representative before using in the work.

H. Synthetic Fiber: Uniformly disperse in concrete mixture at rates specified in Part 2.3A and Part 2.3B.

## 2.7 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

B. Place as per the project Plans.

## 2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

# PART 3 - EXECUTION

## 3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

## 3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

## 3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

## 3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Owner's Representative.

C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

## 3.5 CONCRETE PLACEMENT

A. Refer to Specification 321313 for placement of concrete at walkways.

B. Before placing concrete, verify that

1. Compacted subgrade soil is acceptable and ready to support paving and imposed loads.
2. Compacted subbase is acceptable and ready to support paving and imposed loads.
3. Gradients and elevations of base are correct.
4. Installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed
5. Moisten base to minimize absorption of water from fresh concrete.
6. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.
7. Notify Owner's Representative minimum 24 hours prior to commencement of concreting operations.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

E. Weather Conditions: Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.

1. Hot Weather:

a. Provide adequate controls to insure that the temperature of the concrete when placed does not exceed 90 degrees F., and make every effort to place it at a lower temperature. The temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set or cold joints. Ingredients may be cooled before mixing by shading the aggregates, fog spraying the coarse aggregate, chilling the mixing water or other approved means. Mixing water may be chilled with flake ice or well-crushed ice of a size that will melt completely during mixing, providing the water equivalent of the ice is calculated into the total amount of mixing water.

b. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90ºF, reduce mixing and delivery time to 60 minutes. (ACI 305)

2. Cold Weather:

a. When air temperature is below 40 degrees F heat the mixing water and, if necessary, the aggregates to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement. If the mixing water is heated, do not exceed a temperature of 140 degrees F at the time it is added to the cement and aggregates. (ACI 306)

F. Cold-Weather Placement: Comply with ACI 306.1.

G. Hot-Weather Placement: Comply with ACI 301.

H. Interruption of Concreting: Should placing of concrete be suspended or unavoidably interrupted, keyways and bulkheads shall be provided and steps taken to prevent feather-edging when work is resumed. Horizontal surfaces shall be roughened for bond.

I. Concrete shall be deposited within thirty (30) minutes of completion of mixing. If set retarding admixtures are used, concrete shall be deposited as recommended by the admixture manufacturer. In either case, concrete shall be discharged within 150 minutes of addition of cement to mixer.

J. Retempering concrete, at the project site, by adding water or other means shall not be permitted after the initial specified slump has been obtained and site added admixtures are discharged.

## 3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, and to receive a rubbed finish

C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

2. Apply to exposed surfaces of knee walls at the staircases.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

## 3.7 FINISHING EXTERIOR WALKWAYS AND SLABS

A. Perform work in accordance with Division 32 Section 321313 Cement Concrete Pavement.

## 3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Contractor has the option to apply evaporation retarder to uniformed concrete surfaces if hot, dry, or windy conditions cause rapid moisture loss. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Compound: Apply curing compound immediately after final finishing. Apply according to manufacturer's written instructions.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

## 3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Owner’s Representative. Remove and replace concrete that cannot be repaired and patched to Owner’s Representative approval.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner's Representative will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

Testing Services: Tests shall be performed according to ACI 301.

B. The following Inspections will be performed:

1. Steel reinforcement placement.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength.

C. Concrete Tests (to be performed by the independent testing agency): At each concrete placement that will include testing, two sets of concrete cylinders will be cast and field cured. Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.
    a. Cast and laboratory cure one set of five standard 4" cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    a. Test one set of two 4" diameter field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi .
9. Test results shall be reported in writing to the Owner's Representative, concrete manufacturer, Engineer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Owners Representative but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Owner's Representative. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Owner's Representative.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Contractor shall correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents. Contractor's method of correcting any deficiencies in the work shall be approved by the Owner's Representative.

END OF SECTION 033000

SECTION 312000 EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Attention is directed to the Contract and General Conditions and all Sections of Division 01 – General Requirements which are hereby made a part of the Specification.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

C. Coordinate work with that of all other trades affecting or affected by work of the Section. Cooperate with such trades to assure steady progress of all work under the Contract.

1.2 SUMMARY

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the earthwork as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Laying out and staking all lines and levels.
2. Preparing subgrades for slabs-on-grade, building foundations, walks, pavements, lawns, and plantings.
3. Base course for pavements.
4. Subsurface drainage backfill for walls.
5. Dewatering.
6. Pneumatic trenching (air spade) within drip line of trees to remain.
7. Separation and filter fabrics. Preparing sub-grades for slabs-on-grade, walks, pavements, turf, grasses and plants.
8. Excavating and backfilling for buildings and structures.
9. Subsurface drainage backfill for walls and trenches.
10. Excavating and backfilling trenches for utilities and pits for buried utility structures.
11. Undercutting
12. Placement and compaction of soil fill materials for embankment construction.
13. Rock Excavation

B. Related Sections include the following:

1. Division 31 Section “Soil Erosion and Sedimentation Control” for the Stormwater Pollution Prevention Plan and stormwater discharge permit requirements.

2. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, and removal of above- and below-grade improvements and utilities.
3. Division 31 Section ”Maintenance of Earthwork”
4. Division 31 Section ”Soils for Earthwork”
5. Division 31 Section ”Aggregate for Earthwork”
6. Division 31 Section ”Geosynthetics for Earthwork”
7. Division 32 Section "Soil Preparation" for finish grading, including preparing and placing topsoil and planting soil for lawns.
8. Division 32 Section “Plants" for planting bed establishment and tree and shrub pit excavation and planting.
9. Division 32 Section “Turf & Grasses” for lawn establishment.
10. Division 33 Sections “Storm Drainage”, “Sanitary Sewerage” and “Water Distribution” for utility improvements.

## 1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Layer placed over excavated subgrade in a trench before laying a pipe.

C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations.

1. Additional Excavation: Excavation below subgrade elevations as directed by Landscape Architect. Additional excavation and replacement will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

F. Fill: Soils materials used to raise existing grades.

G. Rock: Rock materials in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. (0.76 cu. m) for bulk excavation or ¾ cu. yd. (0.57 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch (1065 mm) wide, short-tip-radius rock bucket; rated at not less than 120-hp (89 kW) flywheel power with bucket-curling force of not less than 25,000 lbf (111 kN) and stick-crowd force of not less than 18,700 lbf (83 kN); measured according to SAE J-1179.
2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210 hp (157 kW) flywheel power and developing a minimum of 45,000 lbf (200 kN) breakout force; measured according to SAE J-732.

H. Structures: Building, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase course: Course placed between the subgrade and a cement concrete or hot mix asphalt pavement.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base, drainage fill, or topsoil materials.

K. Utilities include on-site underground pipes, conduits, ducts, cables, and appurtenant structures.

## 1.4 QUALITY ASSURANCE

A. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section “Project Meetings.”

## 1.5 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities servicing facilities occupied by Owner or others unless permitted in writing by Owner’s Representative and then only after arranging to provide temporary utility services according to requirements indicated:

1. Do not proceed with utility interruptions without Owner’s Representative’s written permission.
2. Contact Dig Safely New York (U-Dig NY) at 1-800-962-7962 (811) before starting site clearing or excavation operations.
3. Coordinate with Owner and utility companies to shut off services if lines are active.
4. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of utility owner.

# PART 2 - PRODUCTS

A. Refer to Specification Sections 310100, 310513, 310516, and 310519.

## 2.2 PNEUMATIC EXCAVATION (AIR SPADE)

A. Pneumatic Excavating Tool: Excavation within drip line of trees to remain shall be performed through the use of a pneumatic excavation tool with the following requirements:

1. The high air velocity excavation tool shall be specifically designed to fracture, pulverize, and displace porous and semi-porous soils without harming or causing damage to tree roots, existing subsurface utilities or other non-porous objects. The Contractor shall submit catalog cuts from the manufacturer verifying that the pneumatic excavation tool meets the following criteria:

| | | |
|---|---|---|
| a. | Rated Operating Pressure | 6.2 - 7.0 bar |
| b. | Air Stream Velocity at Cutting Head | 2,200 – 2,500 km/hr |
| c. | Air Displacement | 4,000 – 5,000 L/min |

B. Air Compressor: The air compressor may be either a portable or truck-mounted unit and shall be adequately sized as required to power the pneumatic excavation tool in accordance with the manufacturer's recommendations for the pneumatic excavating tool.

C. Vacuum Truck: A vacuum truck should be used to collect excavated spoil directly from the trench or pit.

D. Containment Structure: To prevent the spread of excavated soil onto adjacent roadways and areas beyond the designated work zone limits, the Contractor shall provide a mobile structure or barrier to contain the material dislodged by the pneumatic excavation tool from the trench or pit. Timber or corrugated metal shields, tents supported on tubular frames, or other structures as approved by Landscape Architect may be used

# PART 3 - EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where earthwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge or soil-bearing water runoff or airborne dust to adjacent properties and walkways.

## 3.3 DEWATERING

A. Refer to Specification Section 312319. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water from excavations. Maintain water levels below base of excavation to control hydrostatic pressure on subgrade soils.
2. Establish and maintain temporary drainage ditches and other diversion outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
3. Do not discharge sediment laden water into the adjoining storm or sanitary sewer system or open swales. Pump sediment laden water from excavations into a portable sediment tank or a high-strength, non-woven geotextile fabric bag. Size portable sediment tanks in accordance with the New York Guidelines for Urban Erosion and Sediment Control.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system as needed to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

## 3.4 EXPLOSIVES

A. Explosives: Do not use explosives.

## 3.5 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions

or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Material Storage: Stockpile satisfactory excavated materials where directed until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
2. Dispose of excess soil material and waste materials not re-used.

## 3.6 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

## 3.7 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross section, elevations, and grades.

## 3.8 APPROVAL OF SUBGRADE

A. When excavation has reached required subgrade elevations, notify Geotechnical Engineer who will make an inspection of conditions.

B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Proof-rolling is to be done in the presence of the project Geotechnical Engineer after excavation to required subgrade elevations. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction**,** repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a self propelled roller in non-vibratory mode weighing at least 14,000 lbs.

3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted structural fill as directed.

D. Additional Excavation:

1. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by the Geotechnical Engineer. Excavation of unsuitable material must extend laterally beyond the edge of the footing or slab for a distance equal to or greater than the required depth of the excavation.
2. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.
3. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

## 3.9 UNAUTHORIZED EXCAVATION

A. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimension without specific direction of Geotechnical Engineer. Unauthorized excavation, as well as remedial work directed by Geotechnical Engineer, shall be at Contractor's expense.

B. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Geotechnical Engineer.

1. Fill unauthorized excavation under other construction or utility pipe as directed by Engineer.

## 3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

## 3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Surveying locations of underground utilities for record documents.
2. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
3. Inspecting and testing underground utilities.

4. Removing concrete formwork.
5. Removing trash and debris.

B. Coordinate backfilling with utilities testing.

C. Install warning tape directly above utilities, 18 inches below finished grade, except 6 inches below subgrade under pavements and slabs

## 3.12 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under base course for walks and pavements, use satisfactory soil material.
3. Under footings and foundations, use Granular Base NYSDOT Type 2 (Type A1 Aggregate, as per Section 310516). Under footings and foundations, use Structural Fill to existing grade elevation. All fill placed above existing grade elevation is to be Lightweight Structural Fill. Reference Specification Section 312353, Lightweight Aggregate Structural Fill.

## 3.13 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

## 3.14 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent of Modified Proctor at +/- 2% optimum moisture content.
2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 95 percent.
3. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 95 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

## 3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).
2. Pavements: Plus or minus 1/4 inch (13 mm).

## 3.16 SUBBASE COURSES

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place subbase course material over subgrade under hot-mix asphalt pavement.
3. Shape subbase course to required crown elevations and cross-slope grades.
4. Place subbase course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

## 3.17 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Geotechnical Engineer.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed as the following locations and frequencies:

1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 200 sq. ft. (186 sq. m) or less of paved area, but in no case fewer than three tests.
2. Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of building slab, but in no case fewer than 3 tests.
3. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
4. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

## 3.18 PROTECTION

A. Protecting Graded Areas: Protect newly grades areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by the Owner's Representative; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

D. Protection of Persons and Property: Barricade or steel plate open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthworks operations.

## 3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove **surplus satisfactory soil**, unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. Refer to Specification Section 310100.

END OF SECTION 312000